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Considering Length of Run in Product Pricing

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The relationship between cost and selling price is especially significant when custom production is involved. The results of a thorough analysis of cost differentials arising from order size are reported in this article. Point is made of the validity of applying the same technique in similar lines of business.

IN THE EXTREMELY COMPETITIVE situation which prevails in today's market place, management is more concerned than ever with the question of whether or not current pricing patterns are sound. Members of management are constantly asking whether costs used for pricing guidance are realistic and whether the pricing pattern is generally symmetrical to that of cost. Costs are not the only factor to be considered in establishing unit selling prices, but it is essential that they be known and the information must be accurate.

During the infancy period of a new product and even throughout its growth period, too often many manufacturers have not concerned themselves with the true cost of specific catalogue numbers or, more important, with the order quantity or length of production run. As long as the overall business or an individual product line has shown what appeared to be a satisfactory degree of profitability, there was only nominal thought given to the question of whether the profit reflected on individual items was accurate. As a matter of fact, measurement of profit by specific products was often not asked for or calculated. However, as the industry grew and more companies moved into the field, the keenness of this resulting competition forced management to become increasingly conscious of cost which, in turn, placed increased importance upon the cost accounting function and specifically upon its cost analysis activity.

In the past, common practice of many producers of custom products has been

to quote a fixed price per unit of sale regardless of quantity ordered. Other prevalent pricing practices have been: (1) a fixed unit price plus a flat setup charge, (2) a fixed unit price plus a flat setup charge and a fixed charge for the basic cost of paper work (commonly referred to as an order service charge), and (3) a sliding scale of prices each of which was applicable to a specific order quantity range. The use of a fixed price alone gave no recognition whatever to the changing cost pattern which develops with increased or decreased production runs. The other two reflect increased emphasis on the importance of cost for individual order pricing purposes.

This is in the direction of realism. A purchaser may well be willing to pay higher unit prices for small quantities if prices for larger ones reflect the producer's economies. If this is true, why should the producer hesitate? Facing up to realistic costs, with a corresponding change in pricing practice, should improve the profitability of his business and make for a sounder competitive situation in an industry.

The Eccentricities of Custom (Molding) Business

This paper is based on a cost study made in our business which is strictly custom by nature and very competitive, but the same procedure can be readily applied to like lines of business. In order to put the reader in a position of familiarity, which will make it possible to absorb the details of this study and relate them to other custom fields, a description of the custom plastics field with which this study is concerned is in order. Data displayed in this paper are not results of our study but are for illustration only.

Among the manufacturing processes in this field is that of compression molding which was the forerunner of the plastics industry. It is with this specific process that this paper deals. Compression molding requires a precision mold for making the parts to be formed and molding compound usually in pellet form (for reasons of storage and mold loading space and to reduce the direct labor required to load the mold prior to its closing). The molds are installed in hydraulic presses which range in tonnage from ten to fifteen hundred and in cost from $3000 to $100,000. In operation, the press is closed and a combination of high heat and hydraulic pressure forces the compound into the finished product shape and finish. After a predetermined curing period (time required to bond resin and filler), the press is reopened and the parts removed from the mold. The cycle is then repeated.

It is an important fact that the relationship of press operating time to total molding cycle time is never consistent. Much depends upon the type of mold

used, type of compound, thickness of wall section of molded part, etc. There are many instances in which the operator time required to produce entirely different parts is identical but the cure time might vary as much as 1000 per cent. With varying sizes of presses, each having substantially different operating costs, it is important that the costs applicable to labor and those applicable to equipment be measured separately. In turn, it is important to accurate costing that factory overhead be allocated to specific molded parts in proportion to the direct labor and machine time required in their production.

When the molded parts are removed from the press, they normally have some flash (excess compound) attached which must be removed through further processing, termed "finishing", in order to furnish a satisfactory product. After removal of the flash line, parts may be ready for packing and shipment or may move on to further finishing operations, such as drilling, tapping, buffing, painting, and, in many instances, to an assembly area. Most of these movements between work stations incur handling expense, which is relatively high on short run jobs.

A list and brief description of the cost elements involved is given in Exhibit 1. If an average unit cost is developed, it will be the same, regardless of the size of the customer's order, i.e., regardless of the length of the production run. Essentially, this overlooks the fact that fixed costs per unit of production actually change with a change in the length of the production run, because period of factory time (hours) per unit of production increases as the size of the order is reduced and, conversely, decreases per unit as the size of order increases. However, there is more to this problem than a simple allocation of the so-called "fixed" costs. The following additional costs are often overlooked and must be allocated to specific orders:

1. Minimum clerical expense involved in servicing the customer's order. This includes acknowledging, pricing, ordering material, planning and expediting production, billing, etc.
2. Excess cost of supervision per unit when a number of order changes takes place within a given period.
3. Extra payroll costs when more people are employed to get out the same number of physical units but in smaller quantities per order.
4. Down machine time involved in setup changes which means more than idle fixed costs, i.e., extra startup, some continuing variable costs, etc.
5. Excess handling costs between work stations due to handling smaller quantities, i.e., numbers of people increase as size of order decreases (when same total physical volume is involved).
6. Increased maintenance costs when equipment is set up and torn down more frequently.
7. Increased spoilage ratio on short production runs as a high degree of spoilage is often generated at the start of each run.
8. Excess idle operator time and training expense as he must get the feel for each job more frequently in the instance of shorter runs.
9. Increased unit packing costs when shipping smaller orders.
10. Increased payroll premiums and employee benefits per unit in the instances of shorter runs.

COST COMPONENTS IN MOLDING OPERATIONS

Cost elements are grouped under our cost accounting system as follows:

DIRECT MATERIAL	-	molding powders and pellets - molding compound and metal inserts
DIRECT LABOR Applied	-	direct productive operations such as pellet, press, tumble, drill, buff, assemble, etc.
Unapplied	-	re-work, idle time, training, make-up, setup (mold and finishing fixture), cavities out, etc.
INDIRECT MANUFACTURING EXPENSE Indirect labor	-	supervision, quality control, clerical, material handling, payroll premiums, maintenance, etc.
Indirect material	-	shop supplies, nondurable tools, office and production supplies, maintenance materials, etc.
Fixed costs	-	depreciation, taxes, insurance, rentals.
Other	-	employee benefits, utilities, expense, telephone expense, rearrangement, experimental expenses, etc.
Spoilage	-	all losses occasioned by the scrapping of materials, work-in-process, and finished products (in the plant).
Packing expense	-	cartons, boxes, labels, packing labor, and other expenses incurred in preparing the product for shipment.
Engineering expense	-	mold and product design expense, process engineering, advance and development engineering, etc.
Complaints	-	expenses and losses incurred in connection with the return of parts by customer.

EXHIBIT 1

The fact that these and many other costs become higher per unit with shorter production runs becomes increasingly apparent when cost analysis work is carried out. A substantial area of these costs is represented by normally "variable" items which actually become "fixed" to a greater and greater degree when looking at the cost of specific production runs.

The Study Begins

The study undertaken comprised an analysis of the then current costs, including the determination of the average length of production run to which costs were applicable and how the costs would change with several other average order cycles. A comparison was also made of current unit selling prices of various types of product and length of production run with prices which would be established under a realistic costing practice.

The cost analysis phase was carried out in one of our larger plants. A thirteen week (three month) period was selected which represented one during which overall operations were under good control and production reflected a representative mix, implying also representative material and equipment utilization. A complete analysis was made of the total number of orders placed in the factory during this period. After eliminating the effect of rescheduling, stop orders, material lacking, maintenance holdups, etc., the orders totaled 2,297. During the thirteen-week period, 2,232 orders were completed. With the fast turnover applicable to this industry, this represented a good check against the net orders placed on the factory in the quarter. It was agreed to "factor" costs by 2,250 orders in our study.

An analysis of the statistical information available under our cost system, which utilizes tabulating equipment, indicated that the press hours operated during the period studied totaled 460,510. It was necessary to go further than operating hours, however, as we wanted to know how many press hours were "occupied" in order to realize 460,510 hours of production. Accurate records, maintained perpetually, indicated that the effective press utilization rate during this period was 70 per cent. Therefore, the "press occupied" hours were 657,870 (460510 ÷ .70). Using total press hours of 657,870 and total orders processed of 2,250, we found the average order during the period studied to have required 292 press hours, indicating that the average length of a production run was 12.2 days (292 ÷ 24).

When quoting and/or pricing a specific order, it is appreciated that a quantity greater than that ordered will be produced, because of spoilage, overshipments (a normal practice, allowing up to 10 per cent of order), and returns scrapped. As the average production run of 12.2 days included these items, it was necessary that they be eliminated in order to arrive at a number which would be comparable to the order quantity. Our calculations showed this to be 11.0 days. This does not imply that it was necessary to run off 12.2 days of production in order to fill orders equivalent to 11 days. Quite the contrary, we were shipping something more than the actual order and, therefore, experiencing longer runs. In view of these calculations it

was decided that the actual costs applicable to the 13-week period studied would be considered as being applicable to an 11-day run (average) operation.

Having determined the study period and the base (11-day runs), the next step was to review each cost element in detail and, with the aid of key personnel in other functional areas, to determine how and in what amounts (or degrees) each cost element would have changed, had the plant operated with average production runs of 1, 2, 5, 10, 30, etc. days. The basic assumption in this study was, of course, that we would always deal with the same total physical units of production as affected by the length of individual runs, i.e., the same physical units that were produced during the 13-week period studied (extended to an annual rate). It was reasoned that only by so doing would the variations in costs disclosed by this study have any real value. (Although, in this case, overall costs were well in line, i.e., controlled, similar studies conducted in plants or departments which might have costs somewhat out of line should yield reasonably accurate results, since the analysis is aimed at disclosing differences in costs between varying lengths of run and not at total costs.)

Financial statements for the 13-week period studied reflected the following manufacturing cost:

	Amount (in thousands)	
	Base period	Annual rate
Manufacturing cost		
Direct material		
Productive	$ 762	$3,048
Packing	45	180
Total	807	3,228
Direct labor		
Applied	315	1,260
Unapplied	67	268
Total	382	1,528
Indirect manufacturing expense		
Indirect labor	267	1,068
Other	496	1,984
Total	763	3,052
Total—Shop cost	1,952	7,808
Eng. expense	65	260
Total—Manufacturing cost	$2,017	$8,068

At the outset, it was realized that the degree of accuracy reflected in the results would depend upon the method of estimating changes in total costs applicable to a change in length of production run. Our procedure was to

review each cost element in very fine detail, using all of the statistics available, the experience of the cost accounting personnel, and the assistance of key personnel in other functional areas. Particular stress was laid on the latter when specific operating functions would have the primary responsibility for meeting these changed cost patterns in the event of substantial changes in the length of the production run pattern. It is important here to convey the reasoning back of the calculations on some of the more important cost factors, inasmuch as, only by so doing will others interested in the development of realistic unit product costs benefit by the study.

The Pattern Emerges: Material and Labor Costs

The effect of short runs upon direct material cost does not follow a consistent course for all products. The degree of change is entirely dependent upon whether a stock or special compound is used and the quantities in which it is ordered or stocked. Therefore, it was concluded that the excess cost of compounds and metal inserts for small lots should be calculated independently of the conversion cost. With respect to applied (pure productive) direct labor, it was concluded that, with proper control, there should be no change, related to lot-size, in the expenditure per unit of production. Extra pay for make-up, idle time, etc. would be treated as unapplied direct labor. It was to this unapplied (preparation, corrective, and extra cost) direct labor area that we devoted a large part of our time. This group of costs also includes setup and breakage.

After some cost analysis and discussion with foremen, it was concluded that the cost of setting a specific mold in the press could and should be closely controlled. This would mean that there should be no variation in this cost per set up and that the number of setup men should be a function of the number of orders received and controlled accordingly. It was further concluded that the most reasonable manner in which to recapture setup cost was to either bill it separately to the customer or to incorporate it in the unit product selling price by dividing it over the number of parts ordered. It was agreed that normal setup costs should recognize the cost of setting up pellet machines and finishing fixtures as well as molds. Hence, unit setup cost would increase or decrease proportionately with the length of the run.

One of the common hazards of this industry is that of breakage of mold cavities. When this occurs in specific instances, a decision must be made as to whether to continue operating the mold with a reduced number of cavities.

On occasions, it is necessary to leave the mold running in order to obtain production which is vitally needed. In some instances, it is more economical to complete the order, in spite of extra labor payments,—running it longer to compensate for the cavities out,—than to remove the mold, repair the cavities, and incur additional setup expense and lost machine time. Studies in this area, i.e., of breakage costs, indicated that unit costs would tend to decrease with shorter runs (than 11 days), which is somewhat contrary to the prior opinion. This is because there are fewer parts remaining to be produced in the event of cavity breakage. General calculations indicated that there would be a reduction of 40 per cent in unit cost for this element for 2-day runs, and 15 per cent for 5-day runs. Further, these calculations indicated that 10-day runs would represent the peak for charges in this area and that there would be reductions in the instance of either shorter or longer runs. Except for urgent orders, molds would be pulled much faster on long-run items, with calculations indicating a reduction of 50 per cent for 30-day orders.

Then, there are the various kinds of premium labor cost. The shorter the production run the more difficult it is for the operator to "make out" with normal incentive allowances, resulting in a higher ratio of make-up payments. With trainees, this excess cost increases even faster. Calculations on these two items indicated the following:

	% Increase (Decrease) over 11-day run Average length of run			
	2-day	5-day	15-day	30-day
Make-up payments	30%	12%	(20%)	(75%)
Training payments	45	20	(10)	(50)

Payments for idle time are made for several reasons. Chief among these are material and equipment troubles, mold changes, improper planning, etc. As the length of a production run increases, the impact of these payments drops sharply. Payments in the instance of 11-day runs were reasonably small. However, for 2-day runs we found that the ratio increased by 45 per cent and for 5-day runs by 11 per cent. There was only a nominal drop in this expense for runs in excess of 11 days.

Re-work was considered next. Cost analysis indicated that the highest degree of re-work occurs in the early part of the production order. However, corrective labor is experienced to some extent over the entire run. This means that there is a fixed and variable content to re-work. Using the ratios reflected on the charts developed in this area (per cent to pure productive labor), we found that total re-work labor increased (over 11-day runs) by 22 per

cent in the instance of 2-day runs and 13 per cent on 5-day runs. On the favorable side, we found that this item showed a decrease of 18 per cent on 30-day runs.

The Pattern Emerges: Overhead Costs

In the factory overhead expense area, we followed the same approach as that outlined for direct labor. Because of the relationship of indirect manufacturing cost to total cost, it was important that we give increased attention to each item in this area. Each expense account, by plant section, was analyzed and reviewed with the supervisor responsible for specific types of expense. Some of our reasonings and conclusions are as follows:

1. Supervision—Certain segments busier with short runs, thereby increasing expense per production unit.
2. Quality Control—Definite increase in cost with short runs because of excess handling and fixed degree of inspection in starting jobs.
3. Clerical—Sharp increase in cost because of fixed cost of certain phases regardless of quantity involved.
4. Handling & Expediting—Again an increase. Principal reasons are progressively fewer pieces per press hour and a large fixed element of cost in expediting orders.
5. Payroll Premiums—Increase proportionate to increase in numbers of people to effect same units of production.
6. Maintenance—Increase resulting directly from wear on equipment covered by more frequent setups.
7. Fixed charges—No absolute change, of course, but fewer physical units to allocate charges to.

A thorough analysis of spoilage charges indicated heavier losses at the start of each order, with a levelling off after a reasonable length of run. Much, of course, depends on whether an experienced operator or trainee is operating a specific mold. Proceeding on assumption that a nominal number of trainees would always be present, we allocated high spoilage losses generated by trainees to the actual length of a production run with which they were occupied. Under our cost accounting system, spoilage is calulated on a memorandum basis only, with no separate accounts being maintained. As this item is composed of direct material, direct labor and indirect manufacturing expense it was necessary that we increase the total charges for each of these as shown against 11-day runs by the ratios by which we concluded that spoilage would increase under the varying length of production runs. It is for this reason only, that the direct material and the applied direct labor charges change from those applicable to 11-day production runs.

This study indicated that packing costs would increase moderately in the

SUMMARY OF COSTS APPLICABLE TO CHANGING LENGTHS OF RUN

(Fixed Annual Physical Volume - Dollars in Thousands)

COST ELEMENT	Average Length of Production Run (Order Quantity) 2 Day	5 Day	10 Day	11 Day	15 Day	30 Day
DIRECT MATERIAL						
Productive (a)	$ 777	$ 767	$ 763	$ 762	$ 759	$ 756
Packing	57	49	46	45	44	43
TOTAL	834	816	809	807	803	799
DIRECT LABOR						
Applied	321	317	316	315	314	312
Unapplied	80	71	68	67	64	59
TOTAL	401	388	384	382	378	371
INDIRECT MANUFACTURING EXPENSE						
Indirect Labor	343	292	270	267	264	251
Other	589	525	499	496	487	468
TOTAL	932	817	769	763	751	719
SHOP COST	2 167	2 021	1 962	1 952	1 932	1 889
ENGINEERING EXPENSE (P. E. C. E.)	90	71	65	65	65	65
TOTAL - MANUFACTURING COST	$ 2 257	$ 2 092	$ 2 027	$ 2 017	$ 1 997	$ 1 954
COST INCREASE (Over 30-Day Runs)						
Amount	$ 303	$ 138	$ 73	$ 63	$ 43	$ -
Percent to Manufacturing Cost	15. 5%	7. 1%	3. 7%	3. 2%	2. 2%	-
Percent to Conversion Cost (b)	25. 3%	11. 5%	6. 1%	5. 3%	3. 6%	-
REDUCTION IN PHYSICAL OUTPUT (Over 30-Day Runs)						
Total Orders (13 Week Period)	12 375	4 950	2 475	2 250	1 650	825
Press Hours Lost (c)	115 500	41 250	16 500	14 250	8 250	-
Net Productive Hours (d)	556 620	630 870	655 620	657 870	663 870	672 120
Percent Loss (Over 30-Day Runs)	17. 2%	6. 1%	2. 5%	2. 1%	1. 2%	-
ADJUSTED COST INCREASE (e)						
Percent to Manufacturing Cost	18. 7%	7. 6%	3. 8%	3. 3%	2. 3%	
Percent to Conversion Cost	30. 6%	12. 3%	6. 3%	5. 4%	3. 7%	

(a) Excess cost of material should be factored separately when calculating cost of changing production run patterns.

(b) Conversion cost is equivalent to total manufacturing cost less the cost of direct productive materials.

(c) Average machine hours lost in removing mold, installing new mold, and effecting efficient production in 10 hours.

(d) Press hours during which molds are actually in place.

(e) First cost increase ratios shown factor only increase in certain variable costs. Cost increase ratios shown here factor the reduced output obtainable in a given period of time.

These ratios are obtained by dividing the original cost increase ratios by the ratio of net productive hours, e. g., . 828 in the instance of "2-Day" runs.

EXHIBIT 2

instance of 2-day production runs, because of the inability to consolidate weekly shipments, the fixed cost of labelling and billing and, in many instances, the need to use smaller or less suitable packing containers. However, outside of decidedly short runs, there appeared to be only a nominal change in the cost of packing per unit of production.

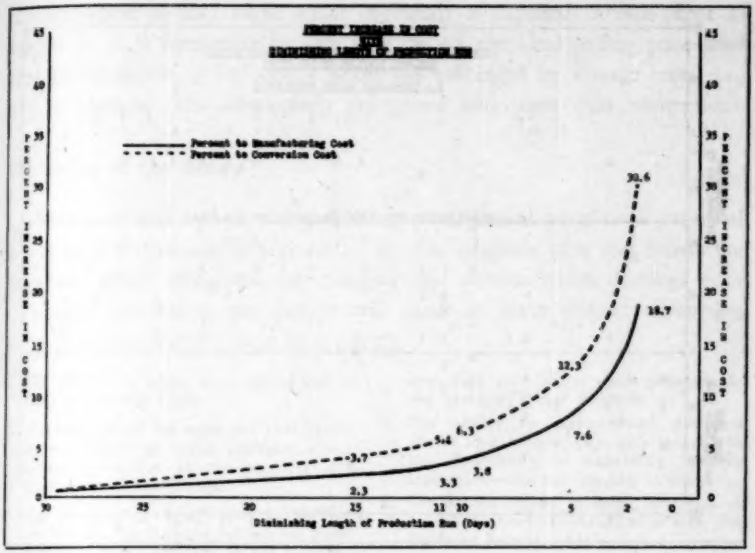

EXHIBIT 3

Product engineering costs are comprised substantially of current product engineering effort, and research and development work. As is true in most industries, this cost area is substantially fixed, as any available time is given to looking ahead. However, if we were to be concerned with orders which averaged only 2-days in length of run, then our product engineering expense would increase.

Setting Forth the Results of the Study

On Exhibit 2 will be found a tabulation of costs applicable to the physical units produced during the 13-week period studied (extended to an annual rate) but produced under varying average lengths of production order runs. The numbers shown are hypothetical, but the reader may proceed on the assumption that costs shown under the 11-day column are actual and that costs shown in other columns are estimated. It will be noted that the cost increases have been related to two different bases, i.e., per cent to manufacturing cost and per cent to conversion cost. Conversion cost represents total manufacturing cost less the cost of direct material. While each base is useful, we prefer the second, as the application of the general cost increase

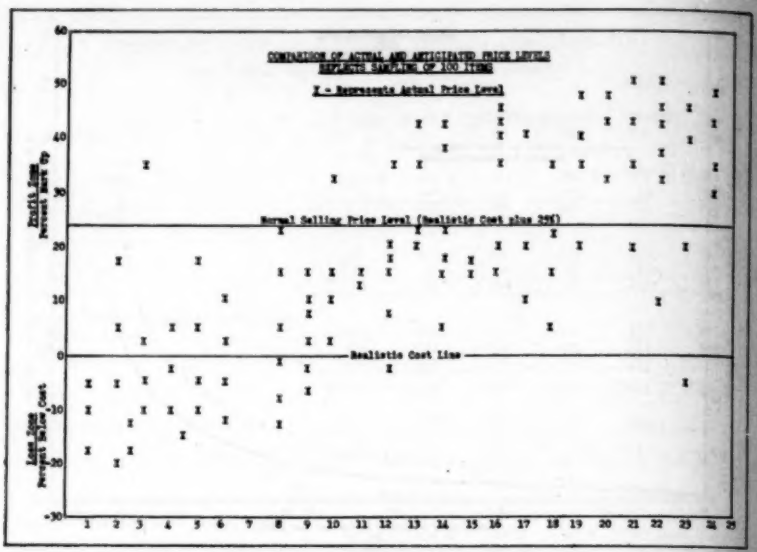
COMPARISON OF ACTUAL AND ANTICIPATED PRICE LEVELS
REFLECTING SAMPLING OF 200 ITEMS
X = Represents Actual Price Level
Normal Selling Price Level (Realistic Cost plus 25%)
Realistic Cost Line
Profit Zone
Percent Mark Up
Loss Zone
Percent Below Cost
40
30
20
10
0
-10
-20
-30
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

EXHIBIT 4

percentage to total manufacturing cost would penalize products having a high material content. Material cost increases, other than those in increases in spoilage loss ratios, are entirely independent of changes in the cost of converting material into a finished product.

Also developed from the study was the graph in Exhibit 3, on which is shown the changing cost pattern which develops against a changing production run pattern. Starting with the 30-day point, note the slow but definite slope of the cost increase line until it reaches roughly the 10-day point. From that point on there is a sharp increase. This line can be projected for production runs as short as 1 or 2 shifts. Such a projection will indicate the undesirabilty of this type of business to molders who are interested primarily in the long-run type of business.

Selling Prices Are Checked

The second phase of our study involved a comparison of the current unit selling prices of various types of product and length of production run (order quantity), with prices which might have been established had cost patterns applicable to varying production runs been available. An illustrative com-

parison similar to that made under our study is included in this paper as Exhibit 4. It is interesting to note how far off the ideal selling price level most prices appear to be because prices are influenced by average costs, i.e., long production runs substantially overpriced and short runs underpriced.

The Value of the Study

The type of cost analysis outlined in this paper should prove to be beneficial in any type of business or segment of it. The adoption of a cost accounting procedure which recognizes the changing cost pattern which develops with a changing production run pattern will result in many distinct advantages accruing to management; some of which are:

1. The ability to price on a sound rather than an average basis.
2. A guarantee of the same per cent return on investment on each product, where prices are based strictly on cost and fixed mark-up percentage.
3. The attainment of a more competitive position on the long-production-run items which are more beneficial to the business.
4. The satisfaction in instances of lost business that such losses were generally in the company's best interests.
5. The ability to make sound decisions (short and long-range) with respect to the desirability of expanding specific businesses—or even staying in them.
6. The determination, in some instances, of compliance or non-compliance with the Robinson-Patman Act.
7. A better basis for justification of costs on defense work.

Organizing New Product Development

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The development of new products can no longer be handled on a hit or miss basis. It has become a recognized part of successful business operations. This paper outlines the considerations and steps required to establish a sound, organized approach to planning and developing products for new and wider markets.

IN A DYNAMIC INDUSTRIAL economy such as is enjoyed in the United States, organized industrial research must be allowed to remain visionary. Scientists must be encouraged to develop the insight to grasp the product needs of tomorrow through the use of the intellectual and physical tools which are made available to them. It is mandatory to examine the development potentials of every art and science. New and improved products and processes are vitally important to the continued growth of any company, for the rapid advances in technologies which occur in an industrialized endeavor shorten the life cycle of all products. Accordingly, a well-formulated, aggressive research program must be constantly pursued to develop new products, and no longer can this problem be dependent on hunches, trial and error, industrial know-how, or primitive scientific notions.

However, it is not to be implied that product development can be accomplished entirely by the research organization. On the contrary, research is only one unit of the team necessary to develop new products. The research unit merely supplies knowledge in the form of principles and ideas materialized to one degree or another. General management and the production, sales, patent, and finance organizations must participate, in creating a new product for the company's line, if development of unprofitable products is to be avoided, or, equally as dangerous, no products which are developed are acceptable.

Objectives of a New Product Planning Program

The objectives of a new product planning program may vary considerably depending upon the size of the company involved and the industry in which it is engaged. However, the objectives should be established to assure that technological effort and the resultant financial expenditures involved are utilized in the most effective manner. Also, the company viewpoint toward improving products or establishing new ones must be taken into account. Many companies, con-

sidering their sales dollar volume position in a particular industry as insurance against operating deficits, improve their products to maintain this position. Others secure the same result and maintain optimum production volume in addition by the introduction of new products. Still others wish to assure an increase in their share of the available potential in a particular market and accomplish this by analyzing all competitors' products as to styling, price, performance, etc., and improve existing products or develop a new product to achieve a competitive advantage.

One of the most important objectives of a new product planning program should be to prevent possible adverse economic effects which can result when a company becomes the victim of product non-diversity. This matter of non-diversity is considered so serious in American industry that, when it is not possible to develop any new products because of lack of know-how or lack of time to replace a "dying" product, other products, and even entire product markets, are acquired by purchase. This is because diversity of product line has come to be regarded as necessary product protection. Here, then, is the governing objective —increased net profits. A more profitable sales volume can be accomplished if, as part of new product planning, there is a systematic elimination of non-profitable product lines and, as this is done, new products must be introduced which can be produced at lower cost or will command markets and sales prices resulting in greater net return.

Product Planning's Place in the Organization Structure

Probably the foremost reason for the ineffectiveness of product planning in some companies is the lack of a proper organization to coordinate all phases of the product planning effort. This is particularly true in the larger companies which have separate divisions and subsidiaries or which may have many different product lines. Decentralization of organization and diversification of products creates many situations and circumstances which tend to defeat effective new product development, unless responsibility for this phase of the business is properly delegated and a formal organization is established to discharge such responsibility. Hence, in management planning for this facet of an industrial enterprise, it is important to understand how such an activity is organized and controlled.

To avoid the possibility of lack of interest in new product development on the part of those members of management who are primarily concerned with the commercial aspects of the business and are governed in their attitudes only by the prospect of immediate profit, it is necessary to provide a product planning or-

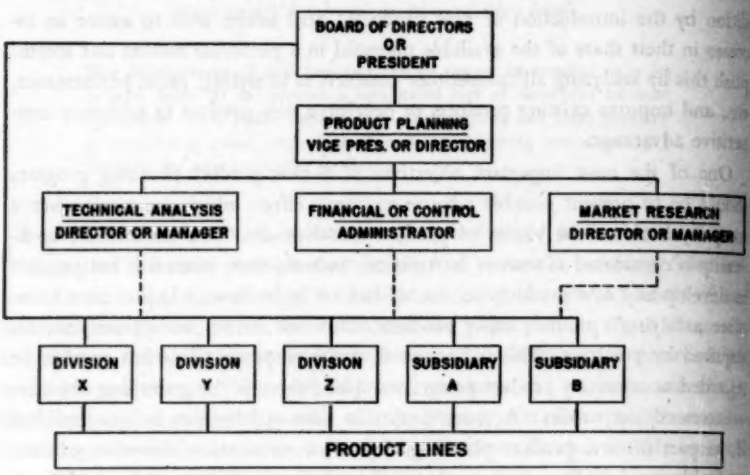

EXHIBIT 1

ganization, with representation at the highest corporate management level and also with separate corporate funds which can be used where and when necessary to finance product development. Much resistance may be encountered from production and sales organizations when the cost of new product must be absorbed in their profit and loss statements. Exhibit 1 is an organization chart of what might be considered an ideal product planning organization.

The vice president or director of product planning should not be confused with the top research or engineering executive. It has been quite often found that products conceived in the research laboratory cannot be sold to the chief engineer of a manufacturing department or division, due to the development expenses which would be required to bring the product to the production stage. Such resistance generally stems from the fact that either the manufacturing division is barely holding its head above water, profit-wise, and does not wish to increase its engineering expense or it and the sales organization are "fat and lazy," so to speak, as a result of a currently very profitable line of products, and do not wish to assume the production and sales problems usually present when a new product is introduced. Also, the engineering department of the manufacturing division may not immediately recognize the potential of the proposed product and, in some cases, personal animosity and plain "pig-headed" stub-

borness have "stymied" the introduction of what might have proven to be a very profitable addition to the company's product line. These considerations suggest that the merits of having a separate impartial product planning executive should be obvious.

The technical director in such an organization should serve in at least a dual capacity. In almost every industry, considerable engineering is required in the development, design, and production of the finished product. The first responsibility of the technical director and his organization is to be alert to and aware of the findings of those engaged in basic and fundamental ("blue sky") research, for the purpose of ascertaining if the principles of scientific discoveries can be applied to existing products or processes for their improvement or, whether, by additional applied research and advanced development, new products or processes can be realized. Secondly, the technical director should analyze new product and process recommendations made by the engineering and development organizations to determine whether or not the tooling, design, installation service, and production requirements are compatible with the particular company's purposes, facilities, and know-how. Quite often, a research finding or engineering recommendation, or even actual inventions, may prove to be revolutionary in terms of scientific accomplishment but may have no possibility of commercial exploitation due to prohibitive cost factors or public welfare implications. As a result, such discoveries cannot be priced to attract the general public and must be dedicated to the public domain, with no monetary gain accruing to the discoverer.

Tie-in with Market Research

The product planning division should include the market research director. He must be depended upon, to a great degree, to determine the conditions outside of the company's organizational orbit which will spell success or failure to the product planning effort. Numbered among the areas which must be explored by the market research organization, centainly not all inclusive so far as some products or businesses may be concerned, are the following:

1. Total market potential in terms of current and future consumer needs and/or desires.
2. Competitive factors such as technical ability, distribution methods, similar products, or brand name monopolies.
3. The assured cyclical stability of the present or proposed market, as compared with the general economy.
4. Installation and service problems which are not adaptable to the company's present organization or will present a new field of endeavor with its related problems.
5. Advertising and promotion requirements to assure compatibility with the overall program.
6. Special government regulations and taxes which may be applicable.

In addition to these considerations, the market research director or coordinator should conduct exhaustive market analyses programs to assure, before additional funds are expended or invested, that a product which may appear to the engineering, production and sales management to be a veritable gold mine is not a pink elephant.

Many companies are bolstering the effectiveness of their market research organizations by consulting independent firms of market analysts, particularly when it appears desirable to interview potential customers to determine their reaction to a proposed product or to analyze a specialized market with which a particular company is entirely unfamiliar or about which little, if anything, is known.

There is necessary also a financial or control administrator of the product planning organization. Upon him rests the very important function of translating the findings of the technical and market analysts into the dollar and cents effect that the launching of any new product will have on the present and future financial condition of the company. Threaded into the financial return that the new product appears to offer are such considerations as the amount of fixed capital investment that is necessary, the additional engineering expenditures required to bring the product to reality, the inventory and distribution risks, and the credit and collection problems. Of no small consequence are the financial valuation of the product's life expectancy in terms of continuing sales volume and the possible additional costs to maintain market leadership when the competition mechanism goes into operation. All of these factors, of course, can have varying impacts on a company's working capital position. Hence, the financial considerations of new product development are of prime importance to a company's top management in establishing priority among the many developments which may result from the product planning program. With rising costs and correspondingly high break-even points, it is necessary to increase volume and profitability by product development. Accordingly, in a competitive system of free enterprise, business managers are more receptive to new products which will produce the optimum profit return with a minimum risk, rather than those that entail varying elements of speculation.

Stages of Planning: Development of the Product

The first stages of product planning provide the place at which it must be decided how much will be spent to explore an art or science, pursue an idea, or to develop a known principle. Usually, an estimate of engineering man-hours can be prepared by the research, engineering, or product planning department when

the problem is known or the principle has been at least established. In cases in which the ultimate results cannot be predetermined or the answer cannot even be anticipated, it is necessary that the product planning executive, together with the other members of top management, decide how much can be spent in a particular scientific area. The availability of funds alone, however, does not necessarily assure that a project will be established and brought to conclusion. If it is decided to perform the project in the research and development department or the engineering department of a particular product line, it becomes necessary to determine the availability of competent engineering talent to assign to the project. Often this means recruiting new personnel, assuming they are available, or engaging the assistance of commercial consultants or faculty members of educational institutions. The same technique is used to move the project through the various stages of product development until it reaches the point at which it can be transferred to the manufacturing organization for design and production.

The amount to be spent at each stage is expressed in terms of engineering hours or days and the funds may be supplied from the departmental engineering budgets or may be supplied from a special corporate fund maintained for this purpose. In the latter case, which, incidentally, is a relatively new approach to this problem as costs are usually charged to departmental operating expense, it is obvious that the age-old squabble about "why should this be charged to my budget?" is avoided. In cases in which marketable products result, it is further customary to charge back these costs to the product line which benefits, for inclusion in the pricing structure of the new product. Such charges are credited to the corporate fund and, theoretically, at least, in a company having prolific product development experience, the fund is replenished and becomes a revolving reservoir from which to finance future worthwhile projects.

Stages of Planning: Revenue and Costs

After a product has been developed and it has been determined that there are no insurmountable production or distribution problems and that a potential market exists, it is then that the profit and loss statement considerations must be faced. The annual sales volume and resulting profit must be determined and projected for a period of at least five years. In cases in which it is found that either a very small annual sales volume can be generated or the market is of short life expectancy, there is a natural reluctance upon the part of management to produce the item under consideration, unless there is little or no capital in-

vestment required or the product lends itself to present tooling and will bolster the level of product volume.

Assuming that a satisfactory market exists, which will produce a gratifying sales volume for an adequate period of time, the matter of manufacturing costs must be considered to assure that the product can be produced at a price that will give the company a competitive pricing position while maintaining a satisfactory profit margin. There may be a tendency upon the part of manufacturing personnel to under-estimate tooling costs, assembly difficulties, scrap, etc., particularly if the new product appears compatible with existing production know-how, facilities, and manpower. Accordingly, it is of utmost importance that accurate, comprehensive data be accumulated to permit a complete study for the purpose of determining the maximum, minimum, and expected average production cost of each new product, before a decision is made to incorporate it in the company's product line.

Some products developed in the course of a company's product planning program will not present any unusual marketing and distribution problems, primarily because these companies confine their development to companion products or have well-established distribution media. However, there may arise costs not present in other items in a standard product line. Such costs as special packaging, unusual advertising and promotion methods, and possible installation and servicing expenses may develop as a result of consumers' usage and acceptance and must be considered in arriving at the ultimate price and prospective profit.

Of very considerable importance in the product planning program is the consideration of the impact upon the working capital requirements of the particular company which may result from the introduction of a new product. In every other respect, a new product may appear to be an unusually sound financial risk but may have to be abandoned because of a questionable rate of return on invested capital from extensive fixed capital investment, an extended fabricating and assembling cycle requiring sizable work-in-process investment, long-term customer financing or unusual credit considerations due to the type of market, or extraordinary advertising, market, and distribution expenses to gain initial acceptance.

There is also the matter of patents and patent rights. The possibility of invention exists at every stage of the industrial research process. Therefore, the financial effect of the patent position with respect to newly-developed products cannot be ignored. If the elements of "use and novelty" are embodied in a new product, inventions may be involved and patent applications can be filed by the inventor. The inventor or his assignee obtains, by the patent, a temporary statutory monopoly and thereby deters competition. Further, monopoly granted by

the patent can give a company an opportunity to grant competitors a license for the use of the invention. Income resulting from such licenses, therefore, is a financial aspect of product planning. Even when it may be decided that a new product will not be exploited by a particular company, it is often found that the patents or patent rights involved are valuable to others and considerable sums can sometimes be realized from their assignment or sale. On the other hand, when a new product is developed, it is always necessary to determine whether or not its construction, use, or sale infringe claims contained in adversely held patents. When this proves to be the case, additional financial considerations are presented. To keep from being excluded from the use or sale of the product, it is desirable to acquire the patent or patent rights involved either by outright purchase or by license. In either case, financial outlays are required, which ultimately affect the selling price or profit margin of the new product.

Screening New Product Ideas

Recognizing the various sources of new products and new product ideas and establishing an effective screening process to assure sound policies and a productive program of product development are the most difficult of the organizing and planning problems. Although the responsibility for these areas will rest with the formal product planning department, it is vitally necessary that its staff enjoy the complete cooperation of top management and every department and employee of the company expected to contribute to the effort.

New products and new product ideas can emanate from any part of a business and, therefore, every individual in a company should be conscious of this possibility and should be encouraged to alert the product planning department to circumstances which may, upon further investigation, lead to valuable new products or improved processes. Numbered among the many sources used by leading companies to obtain product ideas are the following:

1. Systematic review of technical progress reports issued on projects in the basic or fundamental research area.
2. Periodic examination by patent attorneys of each engineer's notebook, maintained by those engaged in the fields of fundamental research, applied research, advanced development and product design and engineering.
3. Constant study of complementary or allied products developed by others.
4. Suggestion programs with monetary incentives available to all employees.
5. "Brain storming" sessions on a regular basis for technical personnel, to produce general intellectual stimulation.
6. An impartial, high calibre program of handling ideas submitted by the general public.

It would appear that the method of screening new product ideas might vary from company to company, industry to industry, and perhaps even from product

to product. On the contrary, it is found in practice that, although certain aspects of the screening process may not bear the same weight in each case, it is, nevertheless, a requisite to examine every angle of a potential new product to gauge its possible effect on the business as a whole and, in this respect, a standard screening process can be adopted which, with slight modification, will serve any type of endeavor or enterprise. The general objectives of new product planning do not vary substantially, regardless of the company or industry. Also, there always exist engineering, management, production, sales, finance, and, frequently, patent considerations in the choice of additions to a company's product line.

Therefore, a formal method of measuring the advantages and disadvantages of new product ideas is appropriately developed, which will reduce to a minimum the amount of speculation contained in a decision to launch a new product. Many companies accomplish the screening process by the use of standard check-lists which are submitted to the key departments heads concerned with engineering, sales, distribution, finance, patents and production, as a guide in evaluating the merits of a proposed new product. On the basis of the data supplied by each member of the operating management, the product planning department can, after considering the results of its impartial technical appraisal, market research and financial evaluation, determine the merits (or lack of merits) of the new product and can recommend to top management, accordingly. Variations of the check-list technique of screening are found in the use of arithmetical rating systems, return and investment ratio indications, and other evaluation methods. When planning product development, it is only necessary to provide, in the screening of new product ideas, for a realistic appraisal of all the factors inherent in the creation, manufacturing, and merchandising of any new product. The technique by which this is achieved is relatively unimportant, so long as it is accomplished.

Keeping Planning in Line with Profitability

It is fundamental that, in the American system of free enterprise, the profit motive be ever present. Therefore, if industrial managements will organize, plan, and finance a sound program of new product development, if production and sales organizations will take reasonable attitudes concerning its offerings, and if research engineers do not let their hair grow any longer than their companies can afford, the standard of living, general good health, and national security of Americans will not only be maintained but will increase at a rate far beyond previous experience.

Accounting Procedures to Facilitate Control of a Major Construction Project

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Many companies are presently engaged in planning facility expansions involving the expenditure of large amounts of money. This paper presents a review of the principal aspects of such a project, with particular emphasis on the variety of methods available for effecting control of expenditures.

ACCOUNTING FOR CONSTRUCTION activities has not been made the subject of a text book so far as I know, and seldom of articles in accounting publications, although an activity as important as construction has accounting problems peculiar to it. In the following pages we will endeavor to touch upon the highlights of the problems and how they were met in an $80,000,000 plant expansion program undertaken by a steel producing company located in the Southwest.

Expansion Plans are Made

The original production facilities had been erected in a manner favorable to future expansion. When the time appeared appropriate, the management of the company engaged a consulting engineering firm to determine the plant layout, make suitable market studies to determine the products to be manufactured, and to perform certain other functions which could not be performed by company personnel. The engineer studied the total requirement of the company, taking particular care to relate the production capacities of existing facilities to the proposed capacities of the new facilities so that a balanced operation would result. Such an operation would ensure that any level of operation of the total plant would provide comparatively the same level of operation for each department or section of the entire company.

After the financing was secured, (a considerable but separate problem not treated here) there remained the problem of determining the organization for the performance of the work. A general contractor was selected to provide the necessary construction organization. In the contract signed between the company and the contractor, certain portions of construction administration were agreed to be performed by the company. The general contractor was required

to provide field supervision, employ the construction forces of all trades and pay them, issue purchase orders for the acquisition of the materials and supplies which were required by the project, provide earth-moving equipment and other construction machinery, maintain a general ledger and certain other accounting records concerned with the cost of erecting the facilities, and submit periodic statements regarding the physical and financial progress of the work.

For his part, the engineer was requested to complete the task of designing the facilities and to provide necessary drawings, blueprints, specifications, etc., for this erection. As a part of this assignment, the engineer secured bids from suppliers of major construction items, reviewed the proposals, submitted and made engineering recommendations to the contracting officer of the company regarding the equipment most suitable and most desirable for installation in the facilities being erected.

Based upon the recommendations of the engineer, the company negotiated for, and purchased, the major items required for the construction program. The contracting officer of the company negotiated during the period of construction more than 460 individual contracts averaging in dollar magnitude from $5,600,000 down to $53.21. The largest contract was for heavy steel shaping and forming machinery, the smallest was for spare parts required for repair and maintenance of some of the new equipment installed during construction.

As an adjunct to the assignment of placing major contracts, the contracting officer was also charged with expediting the rapid completion of the contracted work. Much of the expediting activity was concerned with visiting the contract suppliers to make sure that their work schedules involving the equipment required by the company were being pressed with proper vigor. Some assistance in this effort was obtained from assigning as expediters, in particular instances, the men who were to supervise the facilities when placed in operation. This proved a most effective method, not only of expediting but also of familiarizing individuals with the items of equipment which they were to operate. It also provided a means of gainfully occupying these key operating personnel during the period of construction. It is our opinion that this expediting service, conducted in the suppliers' plants, would be desirable in any construction program.

Activity Moves to the Construction Site

The engineer with his staff of draftsmen, designers, and field men determined the work to be performed and issued drawings to describe it. These were

reviewed and approved by a project manager representing the company. The purpose of this review was to make sure that all the desires and requirements of the company were being met by the engineer's design. The project manager had the authority to speak for the company in regard to any matters pertaining to the construction program and his small staff was composed essentially of "trouble shooters". From the project manager's office, drawings and other necessary information were transmitted to the general contractor.

Continuously auditing the activities of the contractor was the company's construction auditor, whose duty it was to ascertain that all the various stipulations placed upon the general contractor, the engineer, and contract suppliers were met and that the company complied with restrictions imposed by the financing institution.

Two basic documents, the administrative procedure manual and the construction cost estimate, were developed. These provided the control required effectively to administer the total construction program. The administrative procedures manual outlined in detail the practices and procedures to be followed for the hiring of personnel, the purchasing, receiving, warehousing, and issue of materials, the meeting of payrolls, the maintenance of general and cost ledgers, and other suitable administrative procedure matters. This manual was prepared by the general contractor under the terms of his contract. Upon completion, it was submitted to the construction auditor for review, after which the latter submitted for management approval an audit program which was related to the procedures described in the manual.

The construction cost estimate was prepared by the engineer. It detailed each and every part of the total construction program and was suitably sectionalized to recognize the major areas in which construction activities were to take place. The estimate was individually coded by the major sections of the project, with further coding providing for increasingly finer details of construction, to the point of permitting careful cost control of each phase. This cost estimate (which was prepared in time to be used as the basis for the financing program) was the basic document in determining the efficiency of construction operations.

From this point forward, the activities in administering and auditing the construction project were very similar to those practices observed by alert business companies today in ordinary day-by-day transactions. However, to illustrate this in the particular terms of a construction project, the following paragraphs will outline the procedure used for the acquisition of construction materials and the timekeeping for and paying of the construction labor forces.

Purchasing Procedure for Construction Materials

When one of the draftsmen for the engineer completed a drawing, a bill of material was prepared, specifying the kind of materials required, with complete specifications for any special or unusual items. The drawing, with its bill of material, was passed to the office of the company's project manager for review and approval, after which it was transferred to the engineering section in the organization of the general contractor. Here an engineer reviewed and made appropriate notations on the drawing, indicating the estimated number of man-days which would be required to perform the work, where it fell in construction sequence, etc. The bill of material was then passed to the purchasing department. Normally, on common construction supply items, such as valves, wire, nails, or lumber, several hundreds or several thousand units of an item were ordered at one time for placement in the construction warehouse, to be drawn from stock as required.

At the purchasing department, the bill of material was routed to the proper buyer. Each buyer was charged with a specific area of purchasing, e.g. electrical items, machinery and parts, lumber and cement, etc. By terms of the construction administrative procedures manual, each buyer was required to secure at least three competitive bids on items purchased. This restriction helped to ensure a broad range of suppliers, which tended to keep prices in line and, further, helped to develop supply sources. As replies came in, the buyer in charge of the particular commodity listed the quotations in which he was interested. Bids were accepted by item, rather than overall, to achieve lowest cost. This was possible because it was clearly understood by all suppliers, that the company reserved the right to accept any part of any bid.

With the bid tabulation complete, purchase orders were prepared. Copies of the requisition or bill of material, requests for quotations, the bids submitted by the suppliers, and the tabulation of the bids were attached in each case. These purchase orders were signed by the contractor's purchasing agent or, in his absence, by the office manager. They were then transmitted to the office of the project manager for review and approval through countersignature. Daily during the peak of construction activity, and less frequently as activity decreased, copies of all purchase orders were transmitted to the office of a resident engineer representing the financing institution, for his review and approval. As he had the authority to withhold disbursement of funds for construction, all major purchases were discussed with him prior to release of the purchase order.

All material shipped to the construction project was directed to the con-

struction warehouse or, if the material was not of a nature to be received at the warehouse, a member of the warehouse staff was dispatched to the location where the material was to be received, to identify it and prepare a material receiving report. A material receiving report was made for the receipt of every item which came on the construction project. This included rental equipment, purchased construction equipment, purchased materials and supplies (defined on purchase orders negotiated by the general contractor). In a like manner, all materials which were sent from the construction site were duly noted in a shipping record. This record was prepared to cover material sent to others for fabrication, worn tires sent to outside shops for retreading or repair, etc. Subsequent material receiving reports were carefully cross-referenced to ensure return of materials sent out.

Members of the audit staff of the construction auditor were located at the warehouse for the purpose of verifying the accuracy of the receiving reports prepared by employees of the contractor. If the receiving reports were satisfactory, they were stamped "approved" by the auditor. In the accounts payable section at the contractor's office, the material receiving report and the purchase order were matched. Upon receipt of the invoice, the necessary comparisons were made and a form titled "request for approval for payment," which summarized the accounting data shown on the purchase order and the invoice, was prepared. The form and all attached material were sent to the construction auditor's staff for prior review and approval. Only after exhaustive audit were these items approved and returned to the contractor for preparation of the voucher check.

Although the foregoing procedure may sound complicated, it differs from regular practice of most firms today only in the requirement for pre-audit of invoices by the disbursing office, in addition to routine accounts payable audit. We feel that this activity was very important in retaining the company's control over funds during the progress of construction.

Surveying the Payroll Procedures

At the personnel office, whenever a man was employed, a copy of his employment form, was given to members of the audit staff located in the payroll and personnel offices. A file was maintained by the audit staff separate from that maintained for the ordinary functioning of the payroll office. During the week, as work was taking place, members of the contractor's payroll department made field tours on a continuing basis to observe that men who had reported for work were actively working in the construction area. Each day, a member of

the payroll audit staff selected at random the payroll numbers of various men who had reported for work that day. The audit clerk determined where they were working and located them. It was well-known to all of the men on the payroll that these daily checks were being made and we feel that this served to ensure the attendance on the job of the men who entered the gates and were subsequently paid.

At the end of a work week, when the payrolls were prepared, the entire payroll was audited by the payroll audit crew to ensure that correct rates were applied (as evidenced by separately maintained payroll authorization forms) and that the hours worked (as shown on the payroll) were those reported on the daily time register as verified by the field time checkers. After the payroll checks were prepared they were distributed to the men from the payroll office. At irregular intervals, the pay checks were collected by the construction auditor, who personally made payment to the men. Normally, the men collected their checks Friday evening at the time they passed from the work areas. We were much pleased by the effectiveness and workability of our payroll control procedure.

Keeping Track of Costs and Comparisons to the Estimate

We come now to the broader controls, to ensure the integration of all construction accounting. Each contract placed by the company at its home office was recognized by the preparation of a requisition, and subsequently a purchase order, at the construction site. All purchase orders were posted to a commitment control in a set of ledgers maintained by the construction auditor. Through monthly statements of construction progress, the commitment liability and the cash expenditure were shown to indicate the status of construction insofar as financial developments were concerned. These cash expenditures and commitments were shown in relation to the estimated cost of performing the work, as a means of determining any overruns or underruns which might be resulting. Overruns were immediately investigated to determine their cause.

As each portion of the project was finished, a field representative of the engineer issued a notice to all affected parties stating that the construction account was complete and that no further charges could be made to the completed account. In the construction auditor's office, all costs relative to the particular account were accumulated, the total cost was determined, and the account was closed for bookkeeping purposes. At that time, any underruns were recognized. The difference between the estimated amount and the amount spent to complete

the work was placed in a contingency account for application to accounts which may have been overrun in comparison to the estimate.

As stated previously the construction cost estimate was prepared by the engineer and provided estimates of construction cost down to detailed parts of the total construction project. As a measure of control and to provide the necessary cost accounting, all contracts, purchase requisitions, requisitions for release of materials from construction warehouses, weekly payrolls and other documents which indicated incurred cost, were coded to show the point in construction at which the indicated materials and labor were expended. The coding of expenditures was provided by a cost engineer and his staff, who were part of the organization provided by the general contractor.

Setting Up Funds for Disbursement

An initial fund of five million dollars became the general construction fund. Checks to draw from this fund could be signed only by the president, executive vice president, or controller of the company. A second fund, known as the construction fund operating account, was separately established. Signatures approved for release of funds from this account were those of the chief accountant, office manager, or construction superintendent of the general contractor, countersigned by the construction auditor or project manager of the company. Alternatively, one of the latter two individuals' signature together with either the president or executive vice president of the company would suffice. Vouchers prepared to pay vendors were normally signed by the office manager of the general contractor and the construction auditor representing the company. Payments to the general contractor made from this fund were signed by the construction auditor and the company's executive vice president.

At weekly intervals, or more frequently if necessary, the consrtuction auditor would request reimbursement of the operating fund, supporting his request by copies of the vouchers issued during the week. Following review and approval of this reimbursement request, funds were drawn from the general construction account and deposited to the operating account. At monthly intervals, the construction auditor prepared a statement which tabulated the expenditures by detailed construction accounts for the preceding month and recommended reimbursement of the general fund. Upon approval of the statement requesting reimbursement, the financing institution authorized release of funds, which were deposited to the general construction fund.

Any cash receipts in the form of payments of freight claims filed, return of

deposits on returnable containers, sales of miscellaneous scrap, etc., were transmitted to the company's home office for deposit in the general construction fund.

Escalation—and Methods of Calculating It

Many of the contracts which the company placed were for equipment items requiring many months to design, fabricate, test, and deliver. Both the manufacturers of such equipment and the company recognized that prices might increase or decrease during that extended period. They agreed to suitable escalation clauses in the contracts, which would protect the profit margin of the supplier in the event that prices rose during the period and would permit savings to accrue to the purchaser should the wages of labor or price of materials decrease. An escalation clause in a contract, if properly established, will not cover additional costs which might result from a manufacturer's inefficiency.

Manufacturers who have a well-developed cost accounting system and who can provide detailed records of the estimated costs represented by the base contract price and make accurate comparisons to their actual experienced costs at the completion of the work, usually prefer to bill on the basis of the actual cost changes experienced during the period of manufacture. Companies which do not have a well-developed cost accounting system or the manufacturing programs of which are largley governed by influences beyond their control, frequently prefer to rely upon index numbers. The most frequently used indices are provided by the statistical services of the Federal Government and are printed in the Department of Commerce's "Survey of Current Business". Other sources in which index numbers are posted include "The Federal Reserve Bulletin", "Business Week" magazine, "Construction Review", and other governmental or private publications.

One acceptable way of applying index numbers is to take the index number at the date of signing the contract (which thus corresponds to the prices for labor or materials as represented in the contractor's estimate of the cost of producing the equipment for which the contract is negotiated) and deduct it from the index number from the same source, appearing at the date when the contract equipment is delivered to the purchaser. The difference between the two numbers divided by the beginning number will give the percentage of increase or decrease occurring over the entire period. This percentage, applied to the base contract price, determines the amount of escalation to be paid.

A second method of applying escalation index numbers, recognizes that the manufacturer applied labor and material to the performance of the work of manufacturing the equipment during the entire period between the time of

contracting and the time of delivery. The further assumption is that these expenditures were made in equal amounts during every month of the period. In such case, a simple average is taken of all index numbers from the beginning of the period to the date of delivery of the equipment. This simple average is then compared to the beginning index number. The percentage is derived by dividing the difference by the beginning number. This percentage, then applied to the base contract price, determines the escalation applicable.

A third method gives a weighting effect to the monthly index number by extending it by the actual labor dollars or material purchases incurred by the manufacturer during the month to which it applies. In the event that progress payments are stipulated by terms of the contract, the actual progress payments, month by month, might well be used to weight the monthly index number as a means of determining the actual effect that each month's expenditures should have on the total escalation.

The most accurate recognition of either upward or downward escalation will be secured by using actual cost experience, when properly supported by the records of the manufacturer, assuming he has a well-established and accurate cost accounting system. When index numbers are used, the weighting of index numbers by actual expenditures, month by month, will provide the closest approximation to actual increases or decreases experienced by the manufacturer. The first method described, when applied at the end of a period of rising prices, results in reimbursing the manufacturer not only for increased costs of labor and material, but also increases his profit. Conversely, of course, his profit margin is decreased in a period of falling prices.

The Story Told

In the preceding pages has been told, rather briefly but not without significant detail, the story of accounting controls, contract based, applied to the conduct of a large construction project of the type which has become familiar and is apparently to remain so in the foreseeable future. Some of the organization of the project, itself, has doubtless appeared "between the lines." In fact, it is just because the procedure so satisfactorily integrated with the physical features of the project and encompassed its various phases, that it has been narrated here for the benefit of others who may be interested.

Accounting's Part in Defense Contract Terminations

By EDWIN P. JAMES

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In our present economy many companies are involved in business with one or more of the services or government agencies. In the face of rapid technological advancements and policy changes, the possibility of contract termination is always present. This paper provides a comprehensive outline of the accountant's responsibility and duties in arriving at a settlement.

TERMINATION—WHAT AN INVOLVED WORD! One short telegram from a government agency terminating a contract in part or in full for the convenience of the Government sets into motion the intricate wheels of preparing a settlement proposal, with its attendant inventory schedules, subcontractor claims and dozens of other details. There is a special reason, in our line of business, to be ready for this. Due chiefly to swift technological advances, the electronics and aviation industries are more than normally subject to government terminations. As a result, we feel we must be ready to take necessary expeditious action when a termination occurs.

In order to accomplish this purpose, a contract termination procedure has been promulgated at our company, which outlines in detail the steps to be performed by each company division. A summary of action required by the various divisions follows:

1. Contract administration department—Upon receipt of notice of termination from the Government, issue internal termination notice to all concerned. Conduct all negotiations with the contract authorities. Secure inventory disposal instructions. Submit claim for settlement.
2. Sales department—Issue an order acknowledgment change notice to the original order. Issue a termination order acknowledgment for the equipments, products or services terminated. Issue a sales production order change notice for the terminated quantity. Stop issuance of shipping papers on the affected orders and hold for disposition notices.
3. Manufacturing department—(Termination coordinator) Expedite termination activities, such as stopping production and diverting materials. (Production control unit) Screen the bill of material relating to the order for possible diversion of items to other orders and notify the purchasing department and the manufacturing termination coordinator of parts which cannot be used elsewhere. Coordinate manufacturing termination activities with other divisions. Assume responsibility for accumulation, maintenance and disposal of the terminated inventory as instructed, including proper preparation of termination inventory lists. Notify all affected personnel and verify that proper action is being taken.
4. Purchasing department—Review all major subcontracts and purchase orders outstanding under the terminated contract. Send telegraphic termination notice to vendors involved. Prepare pro-

chase change orders. Review subcontractor claims and assist in negotiaton of settlements.

5. Research and development department—(Termination coorcinator) Expedite compliance with termination notice. Provide liaison with other divisions. Assume responsibility for collection, safekeeping and disposal of engineering termination inventory as instructed. Cancel or modify engineering projects.
6. Treasurer—Prepare invoices. Prepare termination tabulating reports as required. Determine insurance and storage charges applicable to the termination, if any. Analyze advance and progress payments affected.
7. Controller—Assume over-all responsibility for termination claim. Analyze and allocate all costs. Assist termination coordinators. Negotiate subcontractor claims. Prepare all final termination forms.

It can be seen from the above outline that the controller's division has the over-all responsibility of handling the termination. It is essential that one division be given that job. Otherwise, a termination lags, with no one at the controls. Inasmuch as, in the final analysis, termination claims are based on accumulated costs, the controller's division seems to be the best place to center the responsibility of producing a final settlement proposal. This article will follow the broad outlines of discharge of this responsibility. A termination claim logically falls into two divisions—the firm's own claim and the claims of its subcontractors. These will be taken up in turn.

Booking and Supporting the Company's Claim

Costs of a terminated contract are accumulated from various tabulating runs. They are removed by journal entry from the accounts to which charged and placed eventually in termination cost of sales. However, this statement telescopes the procedure. Initially, the standard cost of purchased parts, finished components, and finished product is transferred from the regular inventory account involved to the termination inventory account. Applicable variances are then removed from the regular accounts to termination inventory, bringing the cost up to actual. Any pre-production charges, such as tooling, industrial engineering and collateral engineering, are also transferred to termination inventory. The final balance in the termination inventory account is transferred to termination cost of sales and the gross termination claim is placed on the books by debiting termination accounts receivable and crediting sales. Charges for indirect material expense and general and administrative expense are not allocated to the terminated contract by a specific journal entry but are pro-rated to all contracts on an overall basis.

If a claim is settled for the full amount proposed, cash is debited and termination accounts receivable credited. However, usually, adjustments have to be made for disallowances or disposition of termination inventory. Subcontractor claims are cleared through the termination accounts receivable account, with cash

debited as funds are received from the Government and credited as they are forwarded to the subcontractors.

Diversion of parts to other contracts after they have been placed in termination inventory, due to new requirements arising and made possible by a termination inventory status report, poses a problem of related entries. Removal of the part automatically charges the standard cost to the contract affected and credits termination inventory. A special journal entry is then required to debit termination inventory and credit termination cost of sales (since the value of all termination inventory has already been transferred to termination cost of sales) for the standard cost and to charge the contract receiving the part and credit termination cost of sales for the applicable variance.

Beneath and in substantiation of these entries, there are many other functions to be handled from an accounting standpoint, when a termination comes. The major ones are detailed below:

1. Analyze sales orders, production orders and other job assignments against the terminated contract.
2. Study contract file, cost estimating file, and other pertinent background information, and prepare summary of significant points for termination file.
3. Verify that terminated quantities on all work-in-process orders have been cancelled and that per cent of completion of work-in-process inventory is realistic.
4. If any of the terminated items have been completed but not shipped, confirm that the ones not authorized to be shipped after effective date of termination by the contracting officer are moved from finished goods to termination inventory and are included in the claim at contract price.
5. In the case of a partial termination, make an analysis of equitable allocation of costs between units delivered or to be delivered and terminated items. Any increase in per unit cost, due to spreading of start-up costs over a smaller quantity, must be allocated between the terminated and unterminated portion of the contract.
6. Secure list of physical inventory of tools, equipment, special tools, dies, jigs, fixtures, etc., from appropriate departments and prepare Termination Inventory Schedule D based on accounting records.
7. Maintain a record of settlement expense, including not only charges to the terminated sales order, such as handling of termination inventory, but also such items as labor of supervisory and administrative personnel, travel, telephone, telegraph, obsolescence of equipment, insurance, storage, and plant rearrangement expense. Any settlement expense included in the termination claim which has not been charged to the terminated sales order must be transferred out of current overhead accounts.
8. Participate in inventory taking and make spot checks of counts on termination inventory tags in the segregated inventory area.

An Aside on Fixed Fee Contracts

Terminations of cost-plus-fixed-fee contracts are different from terminations of fixed-price contracts in that settlement may be limited to the fixed-fee or include both costs and fixed-fee. Percentage of completion is the usual basis for adjustment of the fixed-fee. If the contractor selects the fixed-fee method, he may continue to submit regular reimbursement cost vouchers (Form 1034) for

costs incurred and include only the earned portion of the fixed-fee on the termination settlement proposal. If he selects the cost and fixed-fee alternative, he is not permitted to use, during the same period of time, both Form 1034 cost vouchers and the settlement proposal in presenting his costs. The final settlement proposal, however, under the latter method, may include all costs incurred in performance of the contract, which have not been previously reimbursed or finally disallowed. Apart from this paragraph, points made in this article relate to fixed price contracts.

Basis of Settlement Proposals

Settlement proposals may be submitted on a total cost or inventory basis, with the latter method preferred by the Government. In any event, a firm must account for all termination inventory. Under a total cost basis, all costs incurred are summarized by element, such as direct material, direct labor, indirect factory expense, etc., rather than by type of inventory. The total cost method is used when the inventory basis is not practicable or will unduly delay settlement. A contract which has barely begun or one involving complicated re-work and other technical aspects are examples. Special permission must be obtained from the contracting officer to file a termination proposal on a total cost basis.

Although there are many problems in a termination, the emphasis is on termination inventory, whether the claim is filed on an inventory or total cost basis. The controller's division must maintain close coordination with the manufacturing and engineering divisions, which forward initial inventory lists on a company form. (Exhibit 1.) From this information, plus descriptions furnished by the engineering catalog department, plus its own cost records, the controller's division assembles the final termination inventory schedule. Usage of termination inventory is encouraged through company-wide distribution of tabulated report on termination inventory status.

Other costs, such as indirect material expense and miscellaneous costs, are then added to the basic inventory cost to arrive at a final proposed settlement after application of general and administrative expenses and profit rates. If deemed appropriate, a reasonable scrap or salvage offer is included. A completed schedule of accounting information is forwarded in each case. This form, although quite often neglected and inadequately completed by contractors and subcontractors alike, is highly important in that it furnishes valuable background information covering the firm's accounting system, which is of great importance in final audit and settlement of the claim. If the claim is sizable, an application

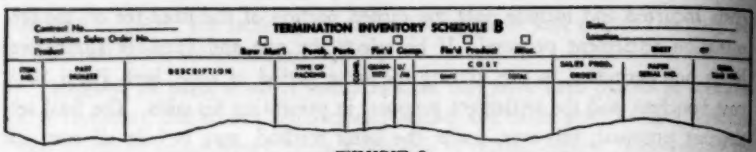
TERMINATION INVENTORY SCHEDULE B

EXHIBIT 1

for partial payment is also submitted. In this manner a contractor may recover (say) from 90 per cent to 100 per cent of his basic costs in advance of the final settlement.

The provisions of Section VIII of the Armed Service Procurement Regulation are followed on all termination proposals. In addition, it is well to be familiar with the requirements of the various services as to number of forms, inventory descriptions, etc., as ASPR covers only the broad regulations and each Service has its own detailed instructions.

Processing Subcontractor Claims

Rare indeed is the government termination which does not produce a subcontractor claim. In many cases, settlement of such claims become involved due to inventory usage, placing of additional orders for the same part, or basic disagreement on markup factors. Many small subcontractors with little termination experience find the various termination forms rather involved and cases of incorrectly prepared claims are common.

The initial action in handling subcontractors on a termination is up to the purchasing department which, in conjunction with the production control department, determines which parts affected by the termination and covered by pending orders with subcontractors cannot be diverted to other jobs or contracts. Telegraphic notices of termination are immediately forwarded to the firms involved, advising them to cease work. This is followed up by a purchase change order confirming the termination, a letter of instructions in regard to termination procedure, and the forwarding of a standard form for the subcontractor to indicate whether or not he plans to file a claim and, if so, whether it will be over or under $1,000. By indicating he does not intend to file a claim, the subcontractor automatically signs a release of liability.

As these subcontractor termination reply forms are returned, they are forwarded to the controller's division, which also receives copies of all termination purchase change orders and subsequent changes to the affected purchase order. A master control sheet is then set up by the division, in subcontractor alphabetical

CHECK LIST FOR OFFICE REVIEW OF SUBCONTRACTORS' TERMINATION CLAIMS

1. REVIEW CLAIM FOR GENERAL COMPLIANCE:
   - (a) Proper forms used and complete with required number of copies.
   - (b) Contract reference and termination date correct
   - (c) Proper signature on:
     - (1) Settlement Proposal Certificate
     - (2) Inventory Certificate
     - (3) Accounting Information Form
   - (d) Verify all clerical computations.
   - (e) Check figures in section II to supporting schedules.
   - (f) See that all blanks are completed or checked as not applicable.
   - (g) Verify amounts shown as previously invoiced.

2. APPRAISE REASONABLENESS OF CLAIM:
   - (a) By comparison with total amount of original order.
   - (b) By comparison with original price of terminated quantity.
   - (c) Evidence of profit or loss which subcontractor would have experienced if contract had been completed.
   - (d) By reference to status of deliveries at termination date.

3. ASCERTAIN THAT COSTS INCLUDED REASONABLY APPLY TO TERMINATED ITEMS ONLY

4. CHECK FOR PROPER COMPLETION OF SETTLEMENT PROPOSAL SCHEDULES:
   - (a) Schedule B - Other Costs. Must be itemized and supported by detail.
   - (b) Schedule C - General & Administrative Expenses. Check reasonableness and development of rate. Examine detail of expense included and base used.
   - (c) Schedule D - Profit. Appraise reasonableness in the light of rate included in bid and probable rate which would have been experienced had contract been completed.
   - (d) Schedule E - Settlement Expenses. Ascertain the type of expense included and method of determining.
   - (e) Schedule F - Settlements with Subcontractors. Must be supported by subcontractor settlement proposals, office review by higher-tier subcontractor and required certificates. Must include subcontractor's recommendation for approval.
   - (f) Schedule G - Disposal or other credits. Must contain sufficient detail and include subcontractor's offer for salvage or scrap which amount is to be deducted from the amount of the claim.

5. REVIEW SCHEDULE OF ACCOUNTING INFORMATION TO ASSURE THAT SUBCONTRACTOR'S SYSTEM IS ADEQUATE FOR TERMINATION PURPOSES.

6. INVENTORY SCHEDULES:
   - (a) Must be prepared on prescribed forms, be as complete as possible and show date, classification, prime contractor, subcontractor's complete address, location of material, product or item covered by order, contract and contractor's reference number.
   - (b) All property on inventory schedules must be adequately described. Classification must be sufficient to permit proper screening. Description should include: item number, description, government part or drawing number, condition code, quantity, unit of measure, unit cost, total cost, percentage of completion (work-in-process), and subcontractor's offer.
   - (c) Subcontractor must sign Termination Inventory Schedule Certificate in required number of copies.
   - (d) When in doubt refer to applicable service instructions or discuss with Plant Clearance Officer (AF) or Inspector of Naval Material.

EXHIBIT 2

order, including the following information: subcontractor's name, purchase order number, date waiver of claim received, purchase order quantity with price and total amount, terminated quantity with price and total amount, claim-received date with price and amount, and final negotiated amount of claim.

In the meantime, if deemed appropriate, the controller's division advises the contract administration division to request permission to settle subcontractor claims under $1,000 without prior approval of the contracting officer. In some instances, such authorization may cover claims up to $10,000. The settlement of subcontractor claims is thus greatly facilitated, although such settlements are subject to periodic selective review by the contracting officer, who may revoke the authorization if he determines that the contractor's procedures are not adequate or that improper settlements are being made. In securing an initial approval from a particular Service, it is necessary to forward a copy of the standard termination procedure, and data concerning company termination experience, as well as general background information.

As soon as a subcontractor claim is received, an office review is made, first by the accounting section and then by the purchasing section, with a final review by the controller's division (Exhibit 2). The data compiled goes into detail but we find its compilation necessary in order to secure final government approval of our settlements. As a result of the office review, any one of the following actions may be in order:

1. Accept claim as submitted.
2. Return claim to subcontractor for correction, additional information, or compliance with applicable regulations.
3. Request audit of subcontractor's claim by the government.
4. Arrange for audit by prime contractor.
5. Arrange for meeting with subcontractor to negotiate settlement (subject to government approval).

Disposition of subcontractor's termination inventory is usually a problem. If we desire to acquire it at a price below the value included in the termination claim, prior approval is required from the contracting officer. If the subcontractor has made a scrap offer which is considered reasonable, he must sign a scrap warranty form. If it is considered that the material has value over and above scrap, at least three sealed bids will be required. In any event, a subcontractor must not dispose of his termination inventory until he has received instructions from us to do so, which may in cases require also approval of the contracting officer.

After a final settlement has been negotiated with a subcontractor, a supplemental settlement agreement is prepared and signed by both parties. Our legal staff has developed a settlement agreement form which has been recognized by

the Government as distributable to other contractors as a sample of what should be included in such a form. Briefly, it encompasses the following points:

1. Identification of the parties involved, contract terminated, purchase order terminated, quantity and description of item terminated, and effective date of termination.
2. Certification as to allocation and disposition of inventory, and the rights of the parties to it.
3. Statement of final gross settlement, partial payments, property disposal credits, and final net settlement.
4. Release of liability after payment of agreed amount.
5. Listing of rights and liabilities of parties involved.

If we have authority to settle a subcontractor's claim under contracting officer authorization covering small claims, we request the amount involved from the Government under an application for partial payment and forward the amount due the subcontractor as soon as it is received. If advance funds have already been received in one form or another, immediate payment is made to the subcontractor. In cases in which authorization to settle has not been granted, the subcontractor's claim is forwarded to the contracting officer, along with the covering forms required by the various Services, such as prime contractor's certificate as to allocability of subcontractor's termination inventory, office review of subcontractor's proposal, and covering letter stating that we recommend approval of the claim and including inventory disposition recommendations.

In handling subcontractor termination claims, it is well to remember that business relationships may be jeopardized if too much time is taken to effect a settlement. On the other hand, a hurried, inaccurate settlement is not desirable.

Terminations Require Accounting Control

Termination of government contracts is a problem in many companies largely because it is neglected and sidelined for more pressing current matters. If machinery is set up to handle a termination expeditiously and systematically, difficulties should be minimized and final settlement facilitated. Each termination is a case in itself and must be treated individually. Although a termination cuts across the normal accounting system at obtuse angles, it can be handled like any other accounting problem through the application of sound, generally accepted accounting principles and standards.

Side-Lights on Practice in Defense Contract Bidding

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The many considerations bearing upon the ultimate determination of a bid price for military contracts—including whether or not to bid at all—are reviewed here, largely on the basis of a limited survey of practice related to prior years. It will be readily apparent that careful thought and planning rather than guesswork are indicated if this type of business is to be approached with the same degree of managerial intelligence as commercial business, and as selectively.

SOME TIME AGO, as a member of a group doing research in the field of military procurement, I was afforded an excellent opportunity for first hand study of the pricing policies and procedures employed by a variety of firms in bidding upon military contracts. The objectives of that study were, on the whole, incidental to matters dealt with in this article. As a part of that study, individuals preparing contract bids were questioned concerning the procedures they employed in arriving at bid prices and their conceptions of these prices. These individuals represented thirty-one different firms which supply one of the military procurement agencies with a wide variety of products and were selected in such a way as to constitute a fairly good cross-section of the various types of products procured by this agency and of the types of firms which engage in this business. (However, the list is heavily weighted with successful bidders and because of this, may reflect a closer pricing policy than could be said to be representative of all bidders.)

Bidder Important In Organizational Structure

The survey turned up some revealing facts. About half of the firms interviewed were organized with a special sales section which prepared the bids and administered government contracts and, in some cases, other institutional contracts as well. For the other half, this work was done by sales personnel who had other primary duties. In general, the special sales organization was found in large firms with sales of ten million dollars or more. The person in charge of military contract bidding was ordinarily an important official in the sales organization. For small firms, the sales manager customarily did the bidding

In the larger-sized firms, the official in charge of bidding usually reported directly to the sales manager.

None of the individuals interviewed considered the process of determining bid prices to be a simple one. The general procedures used seemed to be similar among the various firms, although the relative emphasis given to various phases of the process and certain individual practices differed from one firm to another. Steps in the formulation of bids typically involved the decision whether or not to bid, an estimation of costs, consideration of prices bid on recent military contracts, consideration of the interest of the firm in the business, and consideration of pricing strategy.

Deciding Whether or Not to Bid

It appears that specifications of the invitation to bid are studied to determine whether the product is one suited to the firm's manufacturing facilities. Estimates are made of raw material and labor requirements and these are correlated with current production plans to determine whether the company can meet the delivery schedules called for by the contract and how easily this can be done. Rough estimates are made of the probable profits to be earned on the contract, using available cost data and information regarding past contract prices. Consideration is also given to other factors which affect the firm's eagerness for the business. From a consideration of these matters and perhaps others, the firm decides whether it is interested in submitting a bid. Sometimes a bidder will decide that the firm is not interested in the business at the probable price for which the contract will go. In this event, the bidder may simply refuse to bid or he may submit a bid which is obviously high, apparently just to remain in touch with the market. If the bidder decides that the firm is interested in the business, the succeeding steps of the bid forming process are carried out.

Cost Bases Used

The type of cost computed and the accuracy or refinement of cost computations seem to vary considerably among companies but, in every case, some cost estimate is made if the company is interested in the business. Some companies work with out-of-pocket costs and some with arbitrary full costs, but the most usual practice is to work with stripped full costs. Out-of-pocket costs are composed of direct material and direct labor but may also include certain overhead costs if the activities represented by these costs are directly assignable to a contract rather than arbitrarily allocated under overhead or burden rate methods.

Arbitrary full costs usually are the same manufacturing, selling, and administrative costs as computed for civilian output. They include approximately the same direct material and direct labor costs referred to above and also include allocations, using one or more overhead rates, of manufacturing overhead, selling, and administrative costs. Stripped full costs are the same as arbitrary full costs, except that all or a large part of the selling and administrative costs are eliminated. Because of the nature of military contract work, very little, if any, in the way of selling and administrative activity is involved, so that stripped full cost is a more defensible type of cost than arbitrary full costs.

Based upon statements during interviews and upon study of cost data which some of the companies submitted upon request, it seems that about three-quarters work with stripped full costs and that the others are about equally divided between their use of arbitrary full costs and out-of-pocket costs. Although most of the firms worked with stripped full costs, many of them were quick to point out that they were aware of the concept of out-of-pocket costs and that the cost information they worked with was presented in such a form that it showed the out-of-pocket cost as well as the stripped full cost.

The care with which firms estimate their costs is partly reflected in the type of cost used. Arbitrary full cost, for example, ordinarily constitutes a rather careless estimate. However, the type of cost used is not the whole story. Any one type of cost may be estimated carefully or carelessly and there seems to be considerable variation in the care with which estimates are made. Also, some seem to compute costs with more care for some contracts than for others. Perhaps this is related to the degree of close pricing which exists for the product.

Some of the persons interviewed indicated that, for each bid, they funneled a considerable amount of cost-influencing information into their cost department for use in computing highly-refined cost estimates. For example, one company indicated that, for each bid, special information affecting costs flowed into the cost department from the purchasing section, the time study section, and the personnel section, and that, from this information, the cost department was able to build up a very accurate estimate of contract costs which took into account almost every conceivable matter which might make the costs on the contract differ from the costs incurred on previous output.

As a general rule, however, companies do not seem to compute their costs as accurately as this. The more common procedure is for the cost department to estimate the costs, based upon its own standards. These standards are usually corrected for the current degree of plant efficiency, for the existing levels of raw material prices and labor rates, and for some of the major differences between

the costs of civilian output and military output, such as the costs for packing and shipping. On the whole, such a cost estimate is quite satisfactory.

Cost estimates seem to be used to aid the bidder in deciding the minimum price at which he would be willing to undertake the contract. The other considerations which bear upon this decision have to do with the eagerness of the firm for the business and will be discussed in further detail below.

Public Record of Previous Bidding

Most companies subscribe to an independent service which is present at the public opening of bids and compiles information concerning the prices quoted by rival firms. The prices at which recent contracts were awarded is important to individual bidders. However, the patterns of the bids of rivals and the names of the companies involved are also important because of the information they give concerning the eagerness of rivals for the business and the pricing strategy followed.

Taken as a whole, the most recent contract price seems to be regarded as indicating the price level which must be approximated to secure the business and is used first of all to help decide whether the company is interested in the business and, secondly, as a test of the reasonableness of the firm's current bid. The names of the companies bidding on recent contracts and the pattern of their bid prices enter into the final price strategy stage of the bidding procedure and will be discussed in more detail there.

Eagerness for the Business—Reasons Why and Why Not

The eagerness of a company for military business is influenced by many different factors. The most important factors involved are the probable profits to be derived from the contract, the availability of unused capacity, the size of the contract, the impact of military business upon future civilian sales volume, and the necessity of placing the company in a better position for year-end renegotiation. Other factors found to be of importance in a few situations include the desirability of discouraging competition, the need for raw material priorities, the level of finished goods inventories, and the stability of civilian market prices. Taken as a whole, these factors—together with the cost estimate—determine the minimum price the company is willing to bid in order to secure the business. Whether it bids as low as this depends upon still other considerations which will be discussed in the section on price strategy.

Of prime importance is the probable profit to be derived directly from the contract, as judged by taking the difference between cost estimates and the

price at which recent contracts have been let. A comparison of this sort is probably made on a rough basis quite early in the bid formation process in order to determine whether the company is at all interested in bidding on the contract. A more careful estimation of profits is made just prior to the formation of bids.

A vast majority are willing to undertake military contracts at a reduced profit when, because of a softening of civilian demand or for other reasons, an unusual amount of idle production capacity is present. It should also be noted that the availability of unused capacity probably has an influence upon costs and probably also upon the reasonableness of using out-of-pocket costs. Very definitely, the availability of unused capacity enters into bidders' considerations.

Almost as large a majority of companies indicated that, if capacity is available, they are willing to accept a lower profit percentage on large contracts than on small ones, because the total dollar profit involved on a large contract is worth going after. On the other hand, when capacity is tight, large contracts do not have this influence. In fact, under these conditions, a company is likely to remove itself from the bidding or limit its bid to a part of the contract. In either case, the minimum acceptable price is likely to be higher partly because costs are higher and partly because profits must cover the possible loss of civilian business.

Some companies indicated that they were eager to secure military contracts because this afforded a wider distribution of their products and thus favorably influenced future sales in civilian markets. Of course, this effect depends upon the nature of the product and would be present only if the product is one which can be differentiated from those of rival firms through the use of brands or labels. It is likely to have a stronger influence when the company is introducing a newly-developed product than when the product has been on the market for some time.

The other factors regarding the eagerness of companies for military business were mentioned only by a few. Two indicated that they were willing to accept a lower profit on some of their products in order to discourage the growth of small companies which might later become important competitors. In each case, these firms were by far the largest manufacturers for the products in question. Two companies which customarily filled military contracts from finished goods inventories indicated that these inventory levels, as well as the availability of unused capacity, affected their eagerness for the business. One important manufacturer of a particular product indicated that large military contracts for this product were especially attractive as a hedge against unstable civilian prices and that, on at least one occasion, the company had, for this reason, been willing to accept a very low profit in order to secure a contract.

Bidders indicated that they used their cost estimates and these various consid-

erations regarding the acceptable profit, to form some sort of a decision regarding the minimum price they would be willing to accept in order to secure the contract. Actually, very few of the bidders said that this decision was a definite one leading to an exact figure which could be written down. However, from what they did say, it is rather certain that these considerations narrowed down the lowest acceptable price to within a small range.

Pricing Strategy

The type of pricing strategy employed appears to differ, depending upon the type of contract and the type of procurement procedure used by the contracting officer. At the procurement agency under study, the fixed-price type of contract was used almost exclusively. About half of the contracts were placed by formal advertised bidding and about half through negotiation, frequently with a single supplier. Occasionally this agency also employed the type of negotiation in which suppliers were allowed to resubmit their bids on a second or third round of bidding (the identity and price of the low bidder being, of course, a secret). This last type of bidding is considered as negotiation of the "haggling" type.

In all three situations, a firm's purpose in employing pricing strategy was the same, namely to secure the contract at a price which is not lower than is necessary. If a bidder has reason to believe that rival firms will be bidding in a price range which allows sizable profits or, in the case of a monopolist, that the procurement agency would accept such a price, his own pricing strategy ordinarily is to bid somewhat below this range but still at a price which is above the lowest price he would be willing to accept. As one of the bidders said, this is largely a guessing game.

Concerning formal advertised bidding, bidders said that in an effort to gauge the range within which the bids of rivals would fall, they examined recent contract bids and tried to correct these for the probable differences in cost and probable changes in rivals' eagerness for the business. In this connection, it was felt to be important that the bidder know, not only what the low bid had been on previous contracts but also what the pattern of the other bids had been and what price had been bid by each firm. Bidders seemed to know which firms were the ones whose bids would be the hardest to beat and, with regard to these companies, the bidders also seemed to know a great deal about the individual price eccentricities of each. For example, one company might be marked as one which characteristically bid quite low on large contracts, another firm as one which usually did not allow sizable price differentials for hauls to more distant destinations, and still another as one which bid comparatively high on contracts

calling for export packing. This information would be secured from study of bidding patterns on previous contracts. Sometimes a bidder was able to secure casual bits of information from other sources regarding business conditions of particular rivals. This information could be used much more intelligently if the bidder knew just how these particular companies had bid on previous contracts.

After considering the probable range of the bids of rivals, bidders appear to turn to the job of deciding their own price quotations. In general, bidders try to bid just below the expected bids of rivals. However, this comment greatly oversimplifies the actual process, as this and succeeding paragraphs will make apparent. Most of the invitations to bid specify several different destinations to which the product is to be shipped, and many invitations also have different dates of delivery and provide for a part of the contract to be in domestic packing and the other part in export packing. Bidders are expected to give different price quotations for these various parts of the invitation and usually do, with regard to the different destinations and types of packing. The different parts of the invitation are then awarded separately to the lowest bidders. However, on some occasions bidders quote the same price on the various parts of the invitations, sometimes, but not always, with the provision, "all of the contract or none." When this is done, the bidder has decided to direct all his price strategy towards the securing of the contract as a whole. One person indicated that, when his firm seriously needed the business to maintan its production schedules, he frequently bid on this basis at a price so much below what he expected of rivals that there was little risk of losing the contract.

The bidders who quote the same price on all parts of the invitation without the all-or-none-clause frequently are not serious bidders, i.e., their price is out of line with those of the lowest bidders but, on occasion, these bidders are seriously seeking the business and are apparently trying to bid in such a way that they will blanket the bids of rivals and secure some part of the contract if not all of it. Even when a firm quotes different prices for the various destinations and types of packing, the price differentials are often changed so as to confound the efforts of rivals to forecast exactly his price differentials and perhaps afford a better opportunity to obtain a part if not the whole of a contract.

It is also true that, in deciding the quotation for a particular part of the invitation, a bidder frequently will quote a price like $.659 thinking that this will just underbid a rival expected to bid about $.66. Very likely however, the other bidder has anticipated such a possibility and has placed his bid at some figure like $.6579! Many such ingenious pricing practices as these are followed by bidders in their efforts to beat out their rivals and to secure a part or the whole of a contract.

Counter Strategy in Negotiated Bidding

When the procurement agency actively enters into the bargaining, as it does with some types of negotiated bidding, the strategy of the buyer as well as the strategies of the sellers must be considered. With the "haggling" type of negotiation, the buyer is in a position to play the bidders against each other by offering each one in turn the possibility of securing the contract by lowering his price. Such strategy is likely to be effective when a lack of rivalry between companies would otherwise permit the bidding to take place at a level substantially above the minimum price acceptable to individual companies.

However, since the bidders are aware of this possibility, their reactions frequently are to pad their initial bids with the expectation of working the price gradually downward on succeeding bids. On the other hand, the agency is able to maintain a large part of its advantage by reserving the right to terminate the bidding at any time, so that individual bidders do not know when they have had their last chance to bid. This advantage is an important one, because at least some of the companies usually bid seriously on the first or the second round. Even if the bidders know approximately what price is acceptable to the military buyer, they do not know how early in the bidding their rivals will reach this level.

In deciding when to terminate negotiations, buyers usually judge the reasonableness of bids in relation to the lowest level reached in previous contract bidding. Although this appears to be a rather arbitrary basis for judgment, it is not necessarily so. On the whole, each individual doing the buying seemed to be rather well acquainted with his own narrow line of products. Many of them were aware of the prices currently quoted to hospitals and other institutions, the probable costs and profits involved on the contracts, current business conditions, the preference of bidders for large contracts, and the strategy employed by bidders. Although only a few of those doing the buying expressly stated that these factors influenced their actions, it is probably true that most of them took (and take) some if not all of these factors into account. Furthermore, if other factors are more or less constant, the lowest level reached in previous contract bidding may, in fact, be an excellent indicator of the price which returns a fair, competitive profit.

The other aspects of the pricing strategy of companies in bidding negotiations are much the same as that for formal advertised bidding. In the case of negotiated bidding, the procurement agency mails to each bidder information showing the final bids of each firm but not the bids of preceding stages. This information is used by bidders as a guide in bidding on succeeding contracts. In-

asmuch as both the agency and the bidders are likely to place considerable reliance upon the prices established on previous contracts, there is even more reason, with regard to negotiated bidding, to suspect that prices may tend to lag somewhat behind expectations, based upon the various cost and profit influencing factors.

A Specialized Type of Pricing Activity

The study reviewed in this article seemed to show that the factors which influence a firm in establishing its bid prices on military contracts are many in number and differ from time to time, depending upon particular circumstances surrounding the sale. The bidding upon military contracts appears to be a highly specialized type of economic activity with a set of rules, customs, and procedures quite different from that usually considered by a firm in pricing ordinary commercial output. It may be said that the procedures employed in pricing military output usually (but not always) lead to contract prices which are discriminately lower than those set for commercial sale.

Monthly Operating Statements for Bank Management

By EARL E. BENNETT

Comptroller, First National Bank of Poughkeepsie, Poughkeepsie, New York

The increase in the size of small banks has prompted a desire on the part of management for current operating data. In this article, considerations relative to the preparation of a monthly income statement for a small bank are reviewed.

THE PAST DECADE has seen a phenomenal growth in the resources of small banks. Many factors have been at work to build up loan accounts and increase bank deposits. Among these have been inflation, an expanding economy, and the bringing of a variety of new banking services within the reach of the average family. As the banks have grown, a definite need has been created for complete information and pre-analyzed statistics upon which management can base its decisions. Inasmuch as the chief executives of banks are primarily occupied with loans and investments and customer contacts, they should not be compelled to do their own analysis. Unfortunately, little has been done in the majority of the country's banks to supply the president, cashier or other operating head with pre-analyzed information of the type needed, and there are still many banks which have only a hazy idea of what their operating profits are, prior to the closing of the books in July and December.

The Tool Needed

Comprehensive operating statements can be a real aid to management in controlling costs when properly prepared. To be effective, an operating statement should reflect increases and decreases in expenses, changes in income, and any extraordinary income and expense items, free from fluctuations from month to month because of accounting methods. Banks with their books on an accrual basis will find this no problem. However, because the vast majority of small banks are on a cash basis, certain steps must be taken to insure that the figures are not distorted by large expenditures related to more than one accounting period. If the job is carefully done the figures obtained from the first month's operations can be projected to forecast the net earnings for the next five months with tolerable accuracy.

THE PEOPLE'S BANK OF ANYWHERE

Operating Statement for the Month of February 195_*

	MAIN OFFICE	%	BRANCH	%	TOTAL	%
INCOME						
U.S. Bond & Note Interest	$ 12,009.20	15.7	$ 4,509.64	38.4	$ 16,518.84	18.7
Interest on Other Securities	1,267.92	1.7	476.13	4.1	1,744.05	2.0
Discount	30,955.04	40.4	1,854.17	15.8	32,809.21	37.1
Mortgage Interest	24,233.71	31.6	2,005.81	17.1	26,239.52	29.7
TOTAL INTEREST & DISCOUNT	68,465.87	89.4	8,845.75	75.4	77,311.62	87.5
SERVICE CHARGES						
Commercial Accounts	2,422.80	3.2	964.13	8.2	3,386.93	3.8
Special Checking Accounts	3,246.00	4.2	1,456.20	12.4	4,702.20	5.3
Return Items	284.00	.4	31.00	.3	315.00	.4
Notes	590.40	.8	34.65	.3	625.05	.7
Cash Checks	28.45	.0	71.89	.6	100.34	.1
Christmas & Vacation Clubs	14.00	.0	1.50	.0	15.50	.0
Fees, Sales & Purchases of Securities	2.89	.0	5.00	.1	7.89	.0
Bond Redemption Fees	449.60	.6	191.30	1.6	640.90	.7
Money Orders	263.55	.3	45.48	.4	309.03	.4
Savings Accounts	37.00	.1	1.00	.0	38.00	.1
TOTAL SERVICE CHARGES	7,338.69	9.6	2,802.15	23.9	10,140.84	11.5
Silver Storage	250.00	.3	3.00	.0	253.00	.3
Trust Dept. Commissions	119.33	.2	.00	.0	119.33	.1
Collection Fees	110.65	.1	55.67	.5	166.32	.2
Safe Deposit Rentals	292.50	.4	27.00	.2	319.50	.4
TOTAL INCOME	76,577.04	100.0	$ 11,733.57	100.0	$ 88,310.61	100.0
EXPENSES, SCHEDULE 1						
Personnel	$ 26,853.41	46.3	$ 2,903.12	42.5	$ 29,756.53	45.9
General	8,103.39	14.0	474.66	7.0	8,578.05	13.2
Deposit	14,403.57	24.9	2,506.74	36.7	16,910.31	26.1
Outside Services	2,791.40	4.8	50.00	.7	2,841.40	4.4
Use & Occupancy	4,128.81	7.1	828.02	12.1	4,956.83	7.7
Public Relations	1,672.64	2.9	70.92	1.0	1,743.56	2.7
TOTAL EXPENSES	$ 57,953.22	100.0	$ 6,833.46	100.0	$ 64,786.68	100.0
NET INCOME	$ 18,623.82		$ 4,900.11		$ 23,523.93	

*A dollar and percentage column for the period to date is also added to the statement in actual use.

EXHIBIT 1

Exhibit 1 shows a typical operating statement for a bank with branch or branches. There are several valid reasons for grouping the accounts in the given classifications. For example, the income derived from interest and discount is always of paramount interest to top management. Income that comes from service charges also is of prime concern. Expense detail is shown on subsidiary schedules in the same form. The detailed captions, dollar totals for which tie in with figures on the main statement, are as follows:

Use and Occupancy
- Taxes, Property
- Light, Power and Water
- Janitor Supplies
- Repairs, Building
- Fire and Other Building Insurance
- Depreciation, Building
- Depreciation, Equipment and Fixtures
- Totals

Public Relations
- Advertising, Local Newspapers
- Advertising, Radio
- Traveling and Entertainment
- Advertising, Miscellaneous
- Totals

Personnel
- Salaries (adjusted)
- Unemployment Insurance and F.I.C.A.
- Group and disability insurance
- N. Y. State bankers retirement
- Hospitalization and Medical
- Fidelity bond premium
- Directors' fees
- Totals

General
Stationery, printing and supplies
Telephone and telegraph
Postage
Repairs, machine
Machine rentals
General miscellaneous
Periodicals and services
Freight, cartage and express
Other insurance
Totals

Deposit Expense
F.D.I.C. premium (adjusted)
Interest paid (estimated)
Totals

Outside Services
Audits and examinations
Legal fees
Membership dues
Totals

By listing the fringe benefits immediately under salaries, as in the above detail, the full cost of the payroll can be told at a glance and the percentage of the base pay which must be added to any salary to cover employee benefits becomes readily apparent. Likewise the classification, public relations, groups all the expense for advertising under a single head. Use and occupancy should reflect the equivalent of rent. It will be noted that the suggested monthly operating statement calls for showing not only the amounts but also the percentage which each kind of income and expense bears to the gross income and expense. Such percentages can often indicate trends better than amounts and, therefore, can prove of aid to management.

It is surprising that so few banks prepare operating statements, for practically every bank is already doing over half the work for it, by maintaining some form of subsidiary ledgers for income and expenses. It makes little difference whether the expenses are spread on a sheet of analysis paper, entered in the appropriate column in an expense register, posted in a subsidiary ledger on a conventional bookkeeping machine or, if you are fortunate, distributed with tabulating equipment. Once statement forms are prepared, the task becomes simply a matter of inserting figures in the proper columns each month. This can be done by the comptroller, auditor, general bookkeeper or a competent clerk. The delegation of this duty will depend to a large extent upon how confidential management considers the information contained in the statement.

So much for the statement itself. Refinements are necessary to make it a workable tool for those on a cash basis, as will appear from succeeding sections of this article.

Measuring the Period's Income

United States bond and note interest is still one of the largest items in the average bank portfolio and bond purchases and sales can do more to distort an operating statement than any other single item. For example: Interest for three and one-half months (from December 15 through March 31) or $29,-

166.67 would be recorded on a cash basis for the sale on April 1 of $5,000,000.00 U. S. Treasury 2's due June 15 or December 15. If these were immediately replaced by the purchase of $5,000,000.00 2's with a March 15 or September 15 coupon, a net loss of two and one-half months' interest or $20,833.33 would be reflected in the six month operating statement prepared as of June 30, since, on a cash basis, the interest on the new bonds would not be taken into the income account until September 15. The logical solution to this problem is to carry the government bond interest on a monthly accrual basis on the bank's books and maintain a separate ledger on a cash basis for tax purposes. This procedure is not difficult to "sell" if the investment officer has tried to explain a similar loss of income to his board. (He meets the same difficulty you meet in reporting to him.) Interest on other securities is of minor consequence in small banks and needs no special treatment.

Discount and mortgage interest requires no changes to meet the needs of the operating statement. Nearly all mortgages today provide for a payment of principal and interest each month and the interest on almost all notes is collected at least quarterly. This assumes that banks with installment loans credit the interest on these loans, when made, to an unearned discount account and transfer it to the income accounts each month as it is earned.

Other items may be included on the operating statement quite simply. Service charges are collected either daily or monthly and can be taken into the accounts as they are received. Silver storage, trust department commissions, collection fees and safe deposit rentals, are minor items in the average small bank and merit no special treatment.

Relating Expenses to Monthly Periods

Salaries are the largest expense item in a bank and pose a problem in that there are not the same number of pay days in every month. If each quarter is considered as a separate operating period, the extra week's salary of a five pay-day month may be spread over the other two months, thus keeping all three months at approximately the same level and leaving our book figures for the quarter free of adjustment. This is accomplished by making adjustments at the bottom of the schedule (not shown) using the detailed captions which have been listed to bring the monthly figures back in agreement with the ledger control account. The important thing to remember is that no adjustment should appear at the foot of the cumulative column (see note on Exhibit 1) at the end of the third month.

Directors' fees, unemployment insurance, Federal old age benefit contributions

and other fringe benefits require no special handling. Blanket fidelity bonds are usually written for three year terms, with the premium payable within thirty days. Most banks charge the premiums directly to the expense account, even though the amount can run into five figures. We advocate the charging of the premiums for this and all other insurance written for more than one year to a prepaid expense account and charging it monthly on the bank's books, with a credit to the prepaid account.

It would be fine if we could have a steady flow of stationery, printing and supplies from the manufacturer to us and pay for only what is used. Unfortunately, price considerations and time-consuming manufacturing processes often cause banks to end up with relatively large inventories of printed materials. For instance, many commercial banks maintain more than a year's supply of customer stock checks, lithographed on special surface market safety paper. Payment of an extra large bill for stationery will disrupt the orderly pattern of the stationery account for any given month. Bills of this type should be charged to the prepaid expense account and the cost charged to operations once a month, with a credit to the prepaid account for the supplies used. An auxiliary record in the stock room, with frequent inventory verifications, is essential. If the correct figure has been selected at which a stationery invoice is to be handled as a prepaid expense item, there should not be more than a half dozen stationery items in the prepaid expense ledger.

The supervising authorities will not permit the inclusion of Federal deposit insurance company premiums in prepaid expenses, inasmuch as the semi-annual assessment is made for the previous six months. The premium comes due and is payable during the first month of the operating period. One-sixth of the premium is shown for the first month's operations and in the months to follow, with a corresponding adjustment being made in the total for the current period column noted at the bottom of Exhibit 1 and used in the supporting schedules also, the adjustment disappearing from the last column on the sixth month.

Although most banks set up some sort of a reserve for the accrued interest on time deposits, very few make any entries to the interest paid account other than for interest paid on certificates of deposit prior to the closing of the books. In order to have the statement reflect a close approximation of the true net operating profit, an estimate of the accrued interest on savings accounts and certificates of deposit for each of the first five months of a period must be made. For the sixth month, the difference between the closing figure and the total of the estimated interest paid for the first five months is used. A reasonable estimate of the accrued interest for savings accounts can be made by applying the effective interest rate for the previous period to the appropriate balance for the

current period. For example, assume that interest is paid semi-annually on the beginning or low balance for the period. The balance as of the first day of January or July is multiplied by the effective interest rate and one-sixth of the result becomes the month's accrued interest. The effective interest rate factor in this case would be obtained by dividing the interest actually paid on the savings accounts for the previous period by the total of the savings accounts at the beginning of the same period.

There is no justification for not taking outside services into the expense account as they are incurred. Real estate and school taxes are ordinarily payable in advance and may properly become prepaid items at the time of payment and may be distributed monthly. Light, power and water, janitor's supplies and repairs to building are normal charges and may be treated accordingly. Fire and other building insurance is usually written for more than one year and should be routed through the prepaid expense account.

Practically every bank writes off something by way of depreciation on its building and furniture and fixtures once or twice a year. This may be a calculation based on the life of the equipment or building or an arbitrary figure dictated by bank policy In any event, there is no reason why the amount to be charged off cannot be decided in advance and one-sixth or one-twelfth charged to the expense account, as the case may be.

The charges for advertising and public relations remain fairly constant month after month and no adjustment need be made to monthly figures. However, where a fairly large deposit or payment for advertising has been made in advance, it can be considered as a prepaid item.

Provision for taxes on income may be handled simply as an adjustment at the bottom of expense detail or carried over to the operating statement proper, depending upon whether management wants the net profits to be shown before or after taxes.

Developing Comparative, Departmental, and Anticipatory Statements

After a year of preparing monthly operating statement has elapsed, comparative statements for the current period and a year ago for the first quarter, first half, third quarter and the year may be prepared. Subsidiary schedules may or may not be prepared for the comparative statements. Eventually departmental income and expense statements and item costs can be developed. The field seems limitless and the road most rewarding, once the start has been made.

Around the first day of June or December, a complete estimated operating

statement for the final month of the period is drawn up on a forecast basis. In many cases, one-fifth of the balance of an account for the previous five months to date can be used for the month's figure but non-recurring items must be extracted before making calculations, and allowance must be made for all the regular bills not paid during the previous month. The trends of commercial and special checking account service charges, collection fees and safe deposit rentals for the last two months of prior periods must be studied and these ratios applied to the preceding month in arriving at a figure for the statement. Other departments are of valuable assistance in developing figures, since they often know of bills which have not yet been processed. If the job has been well done, it is possible to substantially predict the closing figures. The writer has been able to repeatedly forecast, within one or two thousand dollars, the net profits for a bank with gross income and expenses both running well into the hundreds of thousands of dollars.

Management will appreciate the opportunity to make provision for taxes based on figures close to actual, prior to the closing of the books and will appreciate knowing the net profits in advance.

What's in Expense Center Accounting for Retail Stores?

By KENNETH J. BAUER

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A major revision in accounting control for department and specialty stores was promulgated in the N.R.D.G.A. expense center accounting manual published in late 1954. The author here provides a summation of the many aspects of the new approach, which features a means of measuring productivity in this field.

AT ABOUT THE END of World War I, department stores began use of the formula known as the retail inventory system and, in the 1920's, they began use of a standardized system of allocating expenses. On these two concepts the whole structure of retail accounting has rested until recently. Expense center accounting is a new concept of expense classification, distribution, and control for department and specialty stores. A volume entitled *The Expense Center Accounting Manual,* was published in December 1954, by the National Retail Dry Goods Association. This new manual replaces the old *Standard Expense Accounting Manual,* which was initially published during the mid 1920's and marks the first major change in the traditional department and specialty store expense accounting since that time.

The increasing importance of expense control was the motivating force behind the publishing of a new manual. A good many stores have already adopted this new concept and system and many more will follow in the year ahead. In my opinion, the impact on department and specialty stores will be as great as the retail inventory system was. Stores which have already adopted the new system appear enthusiastic about it.

The Relative Importance of Operating Expenses

Department stores, like most businesses, make money by increasing their gross margin on sales and by reducing their operating expenses in relation to sales. However, the gross profit margins on sales are restricted by competition from stores handling similar or like merchandise, including competition from discount houses, mail order houses and small retailers with little or no overhead. The percentage analysis, given below, of a department store's dollar sale shows the general current conditions and the ideal desired:

	Current	Ideal
Sales	100%	100%
Cost of sales	64%	62%
Gross margin	36%	38%
Operating expense	34%	28%
Net profit	2%	10%

Comparison of the two sets of figures, reveals that the component percentage of sales farthest from attaining the ideal goal is the operating expense percentage. It is also the one which is most directly controlled by management. The selling price, as previously mentioned, is controlled by competition and the cost of sales is governed primarily by the vendors of the merchandise. Logically, therefore, since the operating expense is directly controllable by management and is also furthest out of line with the ideal or desired goal, it should be closely scrutinized. To emphasize again the importance of expense control, the following example is given: A store does an annual sales volume of ten million. Operating expenses are reduced from 34 per cent of sales to 33 per cent, causing a net increase in profits of $100,000. This is a lot of money for a 1 per cent reduction of operating expense ratio.

The Previous Expense Analysis Method

Before going any further, let us briefly review the old expense system so that we can clearly see the changes and improvements of the new one. Under the old system, expenses were classified into five major functions: administrative, occupancy, publicity, buying, selling. Depending on the size of the store and the detail desired, the major functions could be broken down into as many as eighteen sub-functions. Each function or sub-function was composed of a number of the fourteen natural divisions of expense. None of the above functions represented a specific department or specific job of work, but rather only a phase of the operation. By expansion into sub-functional groups, some costs were gathered or grouped together to represent a specific department or specific job of work; however, the costs were not so clearly labeled as they are under expense center accounting.

Expense Center Analysis

The expense center accounting system is composed of three main parts:

1. Expense allocation to expense centers
2. Natural divisions of expense
3. Production unit accounting

The first two are essential in order to operate under the expense center system, but the establishment of production unit accounting is optional and is introduced

into the new system after the first two elements have been established. The word, "optional", as used here in no way lessens the importance of production unit accounting, inasmuch as it is a scientific tool for controlling expense.

The new expense centers eliminate the functional groups and the new designations automatically give a better picture of the expenses. The expense centers are specific departments or specific jobs, each with its prescribed set of natural divisions to which costs are to be allocated. The basic principle of charging to expense centers is to establish a cost for every operation performed and/or every policy adopted by the store. The manual has three groupings of expense centers, labeled Group B, Group C and Group D, with 14, 38 and 71 expense centers, respectively. The number of expense centers each store needs varies according to the degree of detail desired. Each expense center group need not be used intact but may be incorporated with another group, to fit individual needs.

An example of the expansion of expense centers related to accounting expense from Group B through Group D is shown below. This expansion arrangement makes possible the comparison of expenses with other stores even though each uses a different related group of expense centers:

Group B		Group C		Group D	
Expense center number	Name	Expense center number	Name	Expense center number	Name
200	Control and accounting	210	Control and office management	211	Control and office management
		220	Accounting and payroll	215	Mail and messenger service
		230	Accounts payable	221	General accounting and statistical
		250	Sales audit	225	Timekeeping and payroll
				230	Accounts payable
				240	Cash office
				250	Sales audit

The new manual lists the natural divisions of expense applicable to each expense center and clearly sets forth the types of expenses to be charged to it. The natural divisions under expense center accounting total seventeen (as compared to fourteen divisions under the old method) as follows:

01	Payroll	10	Communications
02	Property rentals	11	Pensions
03	Advertising	12	Insurance
04	Taxes	13	Depreciation
05	Imputed interest	14	Professional services
06	Supplies	15	Donations
07	Services purchased	16	Losses from bad debts
08	Unclassified	17	Equipment rentals
09	Traveling		

The natural divisions closely parallel those listed in the old manual, except Code Numbers 11, 15, 16 and 17—representing pensions, donations, losses from bad debts, and equipment rentals, respectively. Pensions take the place that repairs had in the old manual, since repairs are actually a cost operation and, therefore, are represented as an expense center with its own natural division components. The other three natural divisions mentioned are new divisions, formerly included in the unclassified natural division of the old manual.

Relating Analyzed Expenses to Output

Production unit accounting, a cost finding analysis of expense centers is, as previously mentioned, the optional phase of the *expense center accounting manual*. The first two phases, expense centers and natural divisions, must be adopted before use can be made of production unit accounting. If properly applied, production unit accounting can be an effective approach to expense reduction by measuring volume, efficiency and wage rates. Without production unit accounting, the measurement of expense for control and reduction must be based wholly on historical figures of the particular or related businesses, or on national average percentage figures published by the National Retail Dry Goods Association. The new manual includes sample forms for the development of production unit accounting data for calculating productivity and for budgeting. The following are the recommended units of measurement for Group C expense centers.

Expense Center	Recommended Measuring Unit
230—Accounts payable	Merchandise and expense invoices handled
240—Cash office	Cash received
250—Sales audit	Gross sales transactions
300—Accounts receivable and credit	Gross credit sales transactions
420—Advertising	Column inches of newspaper and shopping news advertising
530—Protection	Selling area times selling days
560—Escalators and elevators	Elevator hours
570—Cleaning	Selling area times selling days
610—Personnel	Hours worked by all store employees
620—Employee welfare	Hours worked by all store employees
720—Receiving and returns to vendors	Cost value of merchandise received
730—Checking and marking	Pieces marked and re-marked
760—Delivery	Pieces delivered
820—Direct selling	Gross sales transactions
850—Selling supervision	Selling man hours

As can be seen, only 15 of the 36 expense centers listed in Group C have recommended measuring units. However, a store is free to devise measuring units

for the other centers, based on its own understanding of that center. In many instances, the statistical data required for further refinement in productivity measurement are readily available from current records now being maintained. It may also be that still other recorded data merely need to be summarized for use.

A simple example of production unit accounting in action may be offered by assuming the following analysis of the sales audit expense center. For one month, the store has a sales volume of $500,000 with 100,000 transactions. The total payroll hours required to audit transactions amounted to 400 hours. By dividing the 100,000 transactions by the 400 hours required, we arrive at a productivity of 250 audited transactions per payroll hour. The total payroll expense as reflected in the sales audit expense center payroll account shows $500, or .1 per cent of sales. By dividing the payroll expense by the 400 hours used, we find that the average pay rate per hour is $1.25. The following month sales again are $500,000, but with only 90,000 transactions and with the same total hours, payroll expense and pay rate as the previous month. Under the old system, the difference would not have been noticed. However, under production unit accounting, productivity would show a reduction from 250 transactions per hour to 225 per hour and would highlight the loss of a potential saving. Theoretically, if the work force had been controlled, the auditing job could have been done in 320 hours at a cost of $400 instead of $500. The reverse situation, where it exists, would also be shown clearly in production reports.

The experience gained after a period of operation under production unit accounting will permit the setting of standards of productivity and proper planning of future activity. The regulation of the work force to avoid peaks and valleys of productivity will be assisted. This would not necessarily require a large part-time working staff. A number of workers trained to perform various jobs could be shifted into different centers for certain peak periods and be used to plug holes caused by sickness, resignations and vacations.

Considerations in Making the Conversion

Conversion from the old system to the new expense center system is not difficult if certain advance preparations, outlined below, are made:

1. Determine and select the expense centers required to fulfill the store's needs.
2. Review all job classifications and assign each employee to an expense center payroll number.
3. Appoint a manager or supervisor of each expense center and hold a group meeting telling them of their responsibility and explain the principles and functions, so that they can use the system as an effective management tool. Inform them of the personnel being charged to their expense center.
4. Inform each expense center manager or supervisor as to the unit of measurement to be used to compute productivity and set up mechanics for accumulating the required statistical data.

The changeover operation is likely to prove very enlightening. It will undoubtedly reveal that the old payroll allocation did not keep pace with the transfer of personnel from department to department and that certain old expense accounts were not descriptive of all the charges included in them. With supervisors or managers of expense centers being held responsible for charges to their expense center, it is not likely that erroneous payroll allocations and other expense charges will slip by unchallenged in the future.

This article was written to re-state the advantages and features of expense center accounting by comparing the old *standard expense accounting system* with the new *expense center accounting system*. For one who desires a complete working knowledge of the system, a more detailed explanation can be obtained from the new manual, cited at the start.

Accounting Records for Fuel Oil Dealers

By CHARLES W. ROYSTON

Assistant to Manager, Sales Accounting, Gulf Oil Corp., Pittsburgh, Pa.

Dealership accounting is a field in which available material is still rather limited. A review of the forms and procedures peculiar to the heating oil distribution field, is presented in this article. Accounting for tank truck trips, oil burner mechanics services, and the dealer's items of property are among the topics treated.

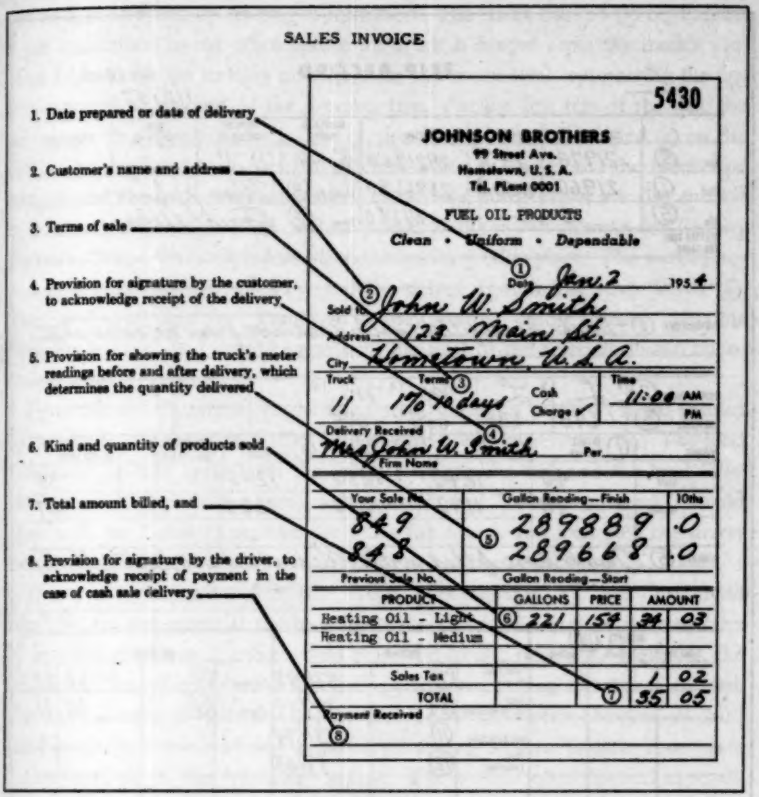
IN ORDER TO PERFORM a much needed and frequently requested service to fuel oil dealers, our company decided that the best approach was to develop a simple accounting system which could be adopted in whole or in part by small businessmen. This service is offered free of charge except that forms which may be required are furnished at cost. Although the system is tailored to the fuel oil business, it provides flexibility and should be readily adaptable to any type of merchandising.

The procedures are predicated upon using seven basic forms to be explained in more detail:

1. Sales invoice—or original record showing quantity of merchandise or material delivered or service rendered, together with the dollar value of the billing to the customer.
2. Trip record—which provides a control over fuel oil stocks placed on the tank truck and includes the delivery salesman's accounting for products delivered, together with the collection and disbursement of company cash.
3. Oil burner mechanic's work order and service report containing information developed in connection with installation or servicing of oil burners, originating with the customer's order and including a record of all information necessary to issue the sales invoice when the work has been completed.
4. Cash and revenue summary to which the trip record financial information is posted and summarized with similar information from all other individual trips.
5. Disbursement and journal summary which, together with the cash and revenue summary, provides the source for all postings to the general ledger.
6. Heating oil inventory control and oil burner and burner parts inventory control which, each in its separate area, affords daily control of inventory and underlies monthly recognition of consumption and losses.
7. Property record, which facilitates keeping track of fixed asset items and permits determination of depreciation.

Sales Invoice

The sales invoice is normally prepared in triplicate at time of delivery, from readings taken from the delivery truck's meter. One copy may be left with the customer, which, on credit deliveries, may show the gallons delivered but not the amount billed, depending upon the practice of the dealer. One copy is used in support of delivery information shown on the trip record. The remaining copy may serve as billing from the office on credit deliveries where customer's


SALES INVOICE
1. Date prepared or date of delivery
2. Customer's name and address
3. Terms of sale
4. Provision for signature by the customer, to acknowledge receipt of the delivery
5. Provision for showing the truck's meter readings before and after delivery, which determines the quantity delivered
6. Kind and quantity of products sold
7. Total amount billed, and
8. Provision for signature by the driver, to acknowledge receipt of payment in the case of cash sale delivery
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FUEL OIL PRODUCTS
Clean • Uniform • Dependable
Date Jan. 2 1954
Sold to John W. Smith
Address 123 Main St.
City Hometown, U. S. A.
Truck 11
Terms 1% 10 days
Cash
Charge ✓
Time 11:00 AM PM
Delivery Received
Mrs John W. Smith
Per
Firm Name
Your Sale No. 849 848
Gallon Reading—Finish 289889 289668
10ths .0 .0
Previous Sale No.
Gallon Reading—Start
PRODUCT
GALLONS
PRICE
AMOUNT
Heating Oil - Light 221 154 34 03
Heating Oil - Medium
Sales Tax 1 02
TOTAL 35 05
Payment Received

EXHIBIT 1

copy does not show the money amount, support for monthly statements rendered to customers or, if not otherwise needed, gallonage record by customer for historical purposes. A sample invoice form with instructions for preparation is shown in Exhibit 1. When there are errors in sales invoices, found at the office when they are turned in with the trip record, the collection or repayment of collection differences is a responsibility of the driver on the next trip, according to a prescribed procedure.

Trip Record

The Trip Record (Exhibit 2) provides a means of checking-in tank truck drivers and oil burner servicemen at the end of each trip or at the end of the

TRIP RECORD NO. 1000

Date 1/2/57

		MILEAGE	TIME	METER	NUMBER OF STOPS	TRUCK OR TRACTOR NO.	SEMI-TRAILER NO.	TRAILER NO.
End	(5)	21978	2- AM PM	292136.0	(5) 14	(1) 11		
Start	(1)	21960	8:30 AM PM	289668.0	Loaded By: (3)	Wm. Johnson		
Trip	(5)	18	5-	2468.0	Driver: (4)	Fred Allen		

DELAYED TIME AND CAUSE

INSTRUCTIONS: (1) Truck hose filled with Medium from previous shift.

COMPARTMENTS: (2)	1 L	2 L	3 M	4 M	5	6	7	8
GUIDE No. (3)	645	635	635	635				

PRODUCT	(1) BEFORE LOADING	(3) QUANTITY LOADED	(3) TOTAL TO BE ACCOUNTED FOR	(5) DISPOSALS	(6) RETURNED TO STOCK	(6) BALANCE ON TRUCK
Light	40	1240	1280	1245		35
Medium	78	1192	1270	1223		47

REMARKS: (5) Truck hose filled with Medium from last delivery.

RECEIPTS (16) Ticket No.	Products	Gallons
TOTAL		

REVENUE			
Total Sales Revenue	(7)	378	88
Less: Bal Credit Sales	(8)	347	14
Bal Cash Sales	(11)	31	74
Plus: Collections	(12)	97	03
Cash Over	(14)		
TOTAL		128	77

SETTLEMENT			
Carriage	(9)	66	93
Checks	(10)	60	91
Trip Expenses	(13)		93
Cash Short	(15)		
TOTAL		128	77

Checked By: Mary Johnson

EXHIBIT 2

day and is used also to accumulate all accounting information pertaining to sales and collections. The trip record accompanies the truck on the trip. A copy is held in the office pending the truck's return (but is destroyed when original is completed and checked). For tank trucks, the trip record is not completed all at one time but rather in four steps, two before the driver starts out on the trip and two after the trip is completed.

The first step sets up starting information. The items marked ① on Exhibit 2 are transcribed in the office before the truck is loaded from the truck's previous trip record, the starting mileage, time and meter total representing the figures reported at the end of the previous trip. For the first trip of the day, the driver's starting time is shown. The caption "compartment," marked ② on the exhibit, is completed to show what products are to be loaded and the number of compartments of each. Any additional instructions to the driver are also entered at this time. The trip record is then passed to the warehouseman for loading the truck. When the truck is loaded, the second step takes place. The warehouseman enters the items marked ③ and the driver signs in the space keyed ④. The "total to account for" should equal the quantity "before loading" plus the "quantity loaded" and should agree with the total of the amounts shown opposite the caption "contents."

Upon the truck's return, as the third step, the items marked ⑤ are entered by the driver and those marked ⑥ are entered by the warehouseman. The total "disposals" should agree with the meter total for the trip and the total "disposals" plus the quantities "returned to stock" and "balance on truck" should agree with the "total to account for." As the fourth and final step the driver then completes the "revenue" and "settlement" sections of the report.

This step is somewhat detailed. "Total sales revenue" ⑦ and "net credit sales" ⑧ are not essential to checking-in the driver and may be entered later by an office employee if entry would delay the truck's next trip. However, the amount of "currency" ⑨ and "checks" ⑩ received during the trip is entered. The total amount of collections to be credited to customer's accounts, as indicated by the remittance advices accumulated during the trip, is entered opposite "collections" ⑫ in the "revenue" section. The amount of authorized expenditures made out of cash receipts during the trip is shown opposite "trip expenses" ⑬. This amount should be supported by attaching receipts to the trip record form. The captions "cash over" ⑭ and "cash short" ⑮ are used for adjusting any errors found in cash-sale invoices when the trip record is checked in the office. The section headed "receipts" ⑯ is used only when the driver delivers two or more successive loads, either out of the dealer's storage or directly out of a bulk plant, before checking-in at the office. The "quantity loaded" must agree with total gallons recorded in this section.

There are two other occasions, besides tank truck trips, for filling out a trip record. Oil burner servicemen, when checking-in at the office, complete the "revenue" and "settlement" sections of a trip record to record the sales invoices they have issued and the collections they have made. Also, in order that all sales and collection information will be reflected on trip record forms, a trip

NO. 103

OIL BURNER MECHANIC'S WORK ORDER AND SERVICE REPORT

Owner's Name: John Jones
Address: 15 Arlington St. Home Town, Pa
Contractor's Name:
Nature of Order or Complaint: No Heat

Order Received: 9 AM/PM Date: 1-2-57
By: RNM
Job assigned to: Steve Logan

- ☐ New Installation
- ☐ Recondition
- ☐ Boiler Burner Unit
- ☐ Furnace Burner Unit
- ☑ Conversion Burner
- ☐ Warranty Service
- ☐ Contract Service
- ☐ Repair
- ☐ C.O.D.
- ☑ Charge

Type Burner	Amer. Rad.
Burner Motor	GE
Blower Unit	
Blower Motor	
Oil Burner Control	
Pump	Webster
Oil Filter	
Grade of Oil	
Type System	Steam

Type Burner	Gem
Blower Motor	
Relay	
No. of Filters	1
Ignition	
Tank Size	275
Equipment Condition	Fair

Report of Work Done: Clogged filter
Installed new nozzle and strainer
" new Centridges

Comments and Recommendations:
Combustion chamber in poor condition
Recommended rebuild or replacement
(Mr. Jones will advise)

OUTSIDE CONTRACT WORK BY: AMOUNT BILLED:

Arrived: 9:45 AM
Reported: 10:45 AM
Total Hours: 1
Miles Driven: 3

Mechanic's Signature: Steve Logan

Above work has been completed to my satisfaction
John Jones
Customer's Signature

EXHIBIT 3

record marked "office" is prepared daily to record the billings issued from and the collections received at the office directly from customers.

After the form is completely filled out, it is passed, with supporting expense receipts, sales invoices, remittance advices, currency and checks, to the office clerk responsible for checking trip records. The clerk verifies that the stock has been accounted for completely and that the various amounts reported in the "revenue"

and "settlement" sections are correct. It is after this verification is completed that the copy of the trip record which was held at the office when the truck was out may be destroyed.

Oil Burner Mechanic's Work Order and Service Report

The Oil Burner Mechanic's Work Order and Service Report (Exhibit 3) is prepared in duplicate and is used to record customer's order and to accumulate all the information required in order to prepare the billing for the work when it has been performed. The heading or complaint section of the form is completed as soon as the order is received. In the second section, the applicable blocks are checked to indicate the type of job and, unless no-charge, whether the invoice is to be cash or charge. The duplicate copy of the form is given to the mechanic and the original is placed in a pending file until the job is completed and billed. It is, however, noted with repair parts drawn from the warehouse for use on the job. The report, comments, and signature section of the form is completed by the mechanic at the location. The comments will often include information of value from a future equipment sales standpoint. The reverse side of the form is used to account for the stock items charged out to the job, whether returned or consumed and to compute the total cost of the items used.

Cash and Revenue Summary

The Cash and Revenue Summary (Exhibit 4) is used to accumulate currently the financial information which appears in the revenue and settlement sections of the trip record, representing billings to customers, allowances, collections made and road expenses incurred by drivers and mechanics in the course of their daily activity. In the data shown on the form exhibited, it is assumed that on January 2 the dealer or his employee made three trips with heating oil, that an oil burner serviceman issued cash sale invoices, and that the office billed burner parts and service and received collections directly from credit customers, each of which has been transcribed from the respective trip record to a separate line of the cash and revenue summary. Similar activities for other days would be posted in the same manner and the total for the month of January determined by adding the various columns. This procedure can be shortened considerably by grouping like items from the various trip record forms and posting only the total transactions for the day to a single line on this form. The cash and revenue summary, when totaled for the month, forms the basis for postings to the general ledger accounts indicated in the columnar headings.

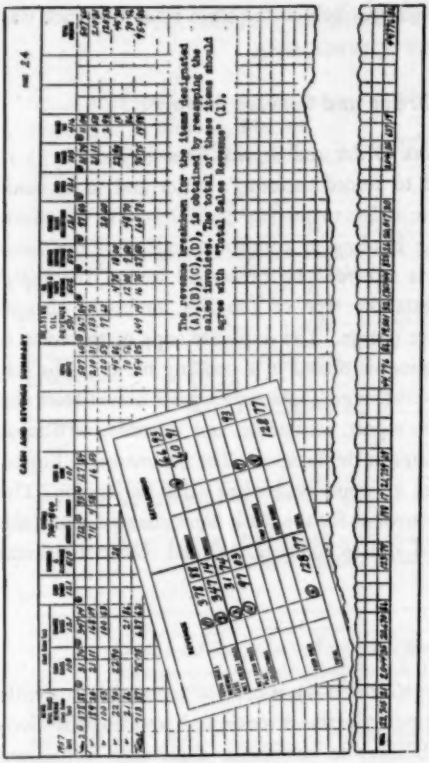

EXHIBIT 4

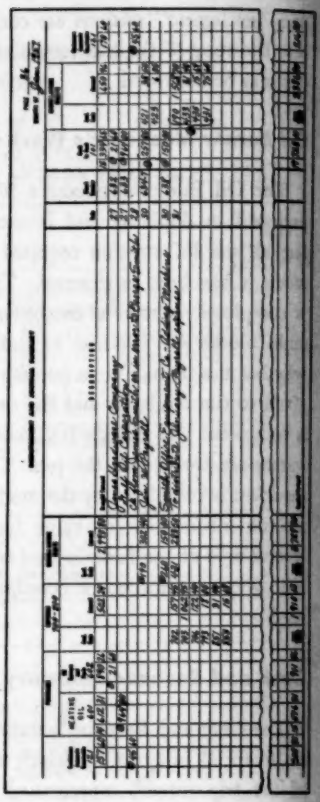

EXHIBIT 5

Disbursement and Journal Summary

To accumulate entries representing purchases and expense disbursements and all other entries of a non-cash or journal nature which are not recorded in the cash and revenue summary, a Disbursement and Journal Summary (Exhibit 5) is used. All entries on the form are accumulated for the month, or accounting period. Cumulative sub-totals may be entered whenever it is desired to determine the total charges or credits to an account for the month to date or to verify that the debit and credit entries on the form are in balance. Postings to the general ledger are made only at the end of the month, or accounting period, in the case of those accounts for which separate columns are provided on the form.

Accounts listed in miscellaneous columns are posted to the general ledger currently. For dealers who elect to control all expenses through one account in the general ledger, only the total for the "expenses" column would be posted to that account and the detail by individual expense account would be posted to an expense ledger.

Six sample transactions have been shown on the exhibit to indicate how the form is used. These represent, as keyed, ① payment of vendor's invoice for oil burner parts, ② payment of supplier's invoice for heating oil, ③ adjustment of a posting error in the accounts receivable ledger, ④ establishing payroll for final week in January, including credits to accounts payable for amounts withheld from employees' pay, ⑤ payment of vendor's invoice for an adding machine, which is charged to office equipment investment, and ⑥ distribution of January payroll expense. This last transaction involves clearing the amount set up during the month in a payroll clearing account, establishing the amount of employer's payroll taxes in accrued liabilities, and adjustment through accrued payroll to include payroll expense applicable to the calendar month.

Heating Oil Inventory Control

A perpetual inventory by type of heating oil with daily entries, is maintained to accumulate monthly receipts and disposals and to determine inventory variations. Receipts are obtained from the delivery tickets covering the individual loads delivered by supplier into the dealer's storage tanks or picked up by the dealer's trucks from supplier's bulk plants or terminals. Under circumstances in which the dealer receives all his stock directly into his trucks at his supplier's bulk plant or terminal, the receipts will, of course, appear in the "receipts" section of the trip records and could be transcribed from that source. Disposals consisting of sales and company use for the day are determined by adding the figures reported in the disposals column of the trip records.

In this connection, when heating oils are taken from stock for use by the company, an unpriced sales invoice, marked "company use," is prepared, and included in the disposals reported on the trip record. In making entries to the inventory control the quantities sold and used are reported separately. At the end of the month, or accounting period, the total of the company use column on the the inventory form may be priced at cost price and an entry made on the disbursement and journal summary, crediting purchases and charging the appropriate expense.

The closing inventory each day includes the stock in storage tanks, determined by actual measurement, plus the balance on truck reported on trip rec-

ords. Any trucks loaded out during the day but not checked in until the following day are included in the day's closing inventory on the basis of the total to account for column of the trip record. The current day's receipts are then added to the previous day's closing inventory and the current day's disposals deducted. Any difference between the remainder and the closing inventory represents either a loss or a gain. Gains and losses are indicated by plus and minus signs, respectively, in separate columns. Periodically the net gain or loss (usually the latter) may be priced at cost price and an entry made on the disbursement and journal summary crediting purchases and charging stock losses, if a loss, or debiting purchases and crediting stock losses, if a gain.

Oil Burners and Burner Parts Inventory Control

A perpetual inventory is also used to control stocks of oil burners and burner parts and provide for computing unit cost prices for pricing inventories, company use disposals and stock losses. A separate card is maintained for each different kind of oil burner and burner part showing the oil burner or part identified by name, description and where pertinent, by manufacturer. Reference column is used to identify the type of receipt or disposal entry. For receipts, the supplier's name may be shown. For disposals, the work order number ordinarily will provide the best means of identification.

Disposals are posted from various sources. Sales and company use are obtained from the used column on the reverse side of completed work orders. Stock losses of burner parts are posted from a list of variations prepared at the time the actual inventory is taken. This list may be priced at current cost price, in order to make an entry to account for the stock losses.

Receipts, both units and cost, are posted from the paid vendor's invoice. This practice avoids making two separate postings for each receipt, one from the delivery ticket or similar receipt record, for the units, and another from supplier's invoice, for the corresponding cost amount. At the end of the month, any stocks which have been received and included in inventory for which supplier's invoice has not yet been received must be accounted for by making an entry charging purchases and crediting accounts payable. Freight bills covering stock which has been included in inventory are handled in the same manner.

Property Record

Exhibit 6 illustrates the mechanics of a simple procedure to account for properties and provide the necessary information to prepare Federal income tax

PROPERTY RECORD

Year beginning July 1, 1957

1 DESCRIPTION OF PROPERTY	2 DATE ACQUIRED	3 COST (OR VALUE) WHEN ACQUIRED	4 DEPRECIATION ALLOWED (OR ALLOWABLE) IN PRIOR YEARS	5 REMAINING COST (OR VALUE) TO BE RECOVERED	6 ESTIMATED LIFE OF PROPERTY WHEN ACQUIRED YEARS	7 REMAINING LIFE AT BEGINNING OF THIS YEAR YEARS—MONTHS	8 DEPRECIATION ALLOWABLE THIS YEAR
Office Building	June 1946	7,500 00	3,300 00	4,200 00	25	14 - 0	300 00
Truck Tank (on truck #2)	Dec. 1950	500 00	325 00	175 00	10	3 - 6	50 00
Ford Truck #11	Aug. 1952	3,500 00	3,383 33	116 67	5	0 - 2	116 67
Truck Tank (on truck #11)	Aug. 1952	400 00	193 33	206 67	10	5 - 2	40 00
Chevrolet Truck #12	July 1953	4,000 00	3,133 33	866 67	5	1 - 1	800 00
Truck Tank (on truck #14)	Oct. 1956	500 00	33 33	466 67	10	9 - 4	50 00
Chevrolet Truck #14	Sept. 1957	4,000 00	—	4,000 00	5	—	667 67
		12,900 00					1,723 34
10,000 gal. Storage Tank with Foundation and Fittings	Sept. 1948	3,600 00	1,575 00	2,025 00	20	11 - 3	180 00
Office Furniture	July 1947	465 00	461 13	3 87	10	0 - 1	3 87
Adding Machine	Aug. 1947	150 00	147 50	2 50	10	0 - 2	2 50
Typewriter	Aug. 1947	120 00	106 00	14 00	10	1 - 2	12 00
Bookkeeping Machine	May 1952	300 00	212 50	87 50	10	2 - 11	30 00
		1,035 00					48 37
TOTALS		25,035 00	12,870 45	12,164 55			2,251 71

EXHIBIT 6

schedules. The form is prepared at the beginning of each fiscal year. One line is used to describe each property item. Each type of property is grouped separately on the form, with blank lines between each group, so that subtotals may be shown to conform with the subaccounts in the general ledger and so that new properties acquired during the year may be recorded in the proper group. The month and year in which the property item was purchased or otherwise acquired are shown. For construction work on new property or improvements, the date completed is supplied.

The amount of depreciation to be accounted for and to be reported on the income tax return for the current year is found by dividing the amount of money

in Column 3 by the number of years in Column 6. If the period shown in Column 7 is less than a year, the amount shown in Column 5 is transcribed to this column. Unless the books are closed monthly or quarterly for the purpose of preparing interim financial statements, there is no need to charge off depreciation except at the end of the fiscal year. This practice makes it possible to handle at one time all the changes affecting depreciation which resulted from purchases and retirements of property items during the year. However, if the books are closed monthly or quarterly, one-twelfth or one-fourth, respectively, of the total amount of depreciation for the year must be charged off before the close of each month or quarter.

When the form is completed and the final totals entered, the total of Column 3 should agree with the net balance in the general ledger, excluding land, and the total of Column 8 should agree with the total amount credited to depreciation reserve and debited to depreciation expense during the year. Properties which become fully depreciated in the current year are charged off before the books are closed at the end of the year.

Accounts Receivable Handling

It is essential that the accounts receivable records be kept accurately and up-to-date, because an important current asset of the business is involved. It is an asset which fluctuates considerably from day to day and may shrink if proper collection effect is not maintained. Besides, in many instances, it is not possible to determine whether current deliveries to customers may be made within established credit limits unless accurate, up-to-date accounts receivable information is available. Of primary inportance, also, in conducting a business is the pleasant customer relationship which can be fostered by maintaining accurate records, for it is irritating to a customer, and may be the cause of ill will, to receive statements which are incorrect, incomplete or carelessly prepared.

Payroll and Personnel Records

The kind and number of payroll and personnel records maintained by dealers will vary considerably. Essentially, however, the payroll problems of a heating oil dealer are similar to those of all businesses and no special treatment is needed here.

Space does not permit the presentation of all the details of the accounting system we have designed for use by fuel oil dealers. However, the above paragraphs have outlined the basic principles involved. Experience to date has proven

the sincere interest in the subject by many of those in the business, and we believe our goal has been achieved. This goal has been to offer a truly simplified but adequate accounting system. Dealers ordinarily fall into the classification of small business, which has perhaps been somewhat neglected in accounting literature. It is also true that dealership accounting, as a specialty, has not been frequently treated. It is hoped that this addition to writings in these two areas will prove helpful to many.

Why We Use Standard Costs—Pointers and Reminders

By THOMAS G. CULLINAN

Plant Accounting Supervisor, Lighting Division, Sylvania Electric Products, Inc., Salem, Mass.

The question of the proper accounting method to use is a continuous subject for discussion in most companies. Widely-accepted as they are, standard costs are by no means accepted everywhere. The author presents here the many facts justifying the use of standard costs for his firm, especially in connection with cost control, pricing assistance, inventory valuation, and budgetary planning.

EXPERIENCE IN COST determination in the various industries has given rise to cost systems which are characteristic of the kinds of manufacturing activity. In the electric lamp industry for instance, operational costing is used, while the plating industry employs job order costing. With regard to the compilation of manufacturing costs, materials and labor costs plus fixed and variable expenses properly allocated to the cost of production, must be computed. This record keeping is absolutely essential, but it is not the most important aspect of the cost accounting plan. Its true value and meaning is demonstrated in the analysis and interpretation of these reported facts. The cost accountant should also investigate variances between actual and expected costs, so that he can aid management in the solution of business problems and assist in cost reduction. Finally, forecasts must be prepared which serve as a basis of planning and budgeting. Cost systems and methods stand or fall as they meet or fail of meeting these objectives.

For these purposes, cost figures fall into two groups, historical and predetermined. Historical costs are compiled after the completion of production or after the fact. Historical costs look back at past activity and present, from a cost viewpoint, the results of previous operations. Predetermined costs are compiled before production takes place, based on management thinking on what the cost should be. Predetermined costs propose to look ahead to show the cost of a future operation for a projected period.

The Problem of Perspective

Predetermined costs grew out of the need of management to know more than past cost performance on their manufacturing operations. They wanted a norm to see if they were producing economically. This need is natural to any field of endeavor, for we attempt to evaluate our performance by means of some reliable comparison. For this

reason management began to measure its current performance with past historical costs. These costs were useful to a point but would serve to perpetuate unfavorable variations if these inefficiencies existed a month or a year ago. With the advent of labor standards, brought about by time and motion studies, predetermined costs became available in reliable form and assumed more significance in controlling costs. This fact resulted in emphasis being shifted from the purely recording duty of the cost accountant to his function of reporter, interpreter and forecaster.

A standard cost, then, is a predetermined cost computed before production is undertaken. Standard costs can be used either on job order costing where the cost of specific jobs put through a factory is ascertained or process or operation costing where the cost of production in one or more manufacturing departments for a given period of time is determined. It is not a different kind of system from job order or process costing, for it can be applied to either and will bring the added advantage of cost analysis hitherto unavailable.

One must keep in mind, in line with the objectives already mentioned, that cost systems or accounting methods and procedures should be established with the view of facilitating management. Over the years, accounting has become specialized but each specialty is in some way a service to or within company management. The primary purpose of its existence is the use that management gets out of it. Because of this, we should not be as concerned with the "how" of a method or plan as we are with the "why" of it. In other words, too much emphasis should not be placed upon methods and procedures. The main effort should be given to the data upon which all the specialties of accounting depend, that is, information — and its evaluation — which reveals what is taking place within a firm.

Benefits Derived from Having Standards

It is only with the proper place of cost systems in the business framework firmly in mind that the advantages accruing to the firm which employs standard costs for control of production costs can be profitably considered. However, if the proper emphasis is kept, these advantages are impressive. The principal ones are:

1. Management can be told when costs are not in line with what they should be. It is these variations or changes in costs between actual and standard costs which are important to management, to provide a measuring stick of performance.
2. Standard costs can reduce time and effort. For example, if materials are carried at standard values, there is no need to calculate inventories on a lifo, fifo, or other similar basis, as all units of like description have the same unit price.
3. Under standard costs, fluctuations from predetermined costs can be broken down to determine which accounts are below standard. Under historical costs, it may be impossible to determine this.
4. The cost of a product may be required for production planning before produc-

tion is started. Standard cost would help where actual cost would not, since historical costs might not be representative.

5. Use of standards places emphasis upon budgetary control because of the close relationship of standards and costs.

In short, in the use of standard cost, the main object is control—control of production and cost by having measuring criteria by which it is possible to ascertain what the costs should have been, what they actually are, and why there is a difference. Standards, like ratios, are convenient means of focusing investigation. Through them, an analyst can determine whether current costs indicate favorable or unfavorable conditions. However, differences from standard, it should be noted, are meaningless if the analyst reaches conclusions without pressing investigation far enough.

Principal Areas in Which Standards Apply

The benefits which accrue to the control of production costs from the use of standard costs have been enumerated. Inasmuch as the control of costs is only one of the phases of the cost accounting plan, the standard cost system, to be workable, must also be able to "perform" in connection with the other functions of price setting, of inventory valuation, and of forecasting. The standard cost system successfully meets the requirements of these purposes, since it can be used:

1. As a factor in setting selling prices—In the lamp industry selling prices are set before manufacturing begins. Therefore, standard predetermined cost has an important part. Such costs are free of excess shrinkage and unusual conditions, which might invalidate initial actual costs if used for pricing.

2. As a basis of inventory valuation—Standard cost in raw material and finished goods excludes excess costs above standards, inasmuch as abnormal costs are absorbed as part of the monthly manufacturing cost. There should be less clerical work involved in carrying standard inventory value than actual inventory value.

3. As an aid in planning control for coming periods—Once the sales budget and production schedules have been established, standard cost can provide information for total manufacturing costs. In addition to this, the history of actual, standard costs and variances provides the basis for forecasting differences which can be expected in the budgeted period.

Standard Costs and Cost Control

Standards are an effective means of cost analysis and control in a lamp plant, because they can be used by management to ascertain the reasons for the variances with actual, which are developed. These variances appear on cost reports expressed in dollars over or under standard costs and center management's attention on these differences. Management is responsible for correcting any deviations from standard, but their disclosure must come first, preferably documented with reasons.

The percentage of material efficiency, which is the quotient of output (production) divided by input (material parts placed in production), is of particular importance to our plant managers. As our material costs account for sixty-five per cent of the

total manufacturing costs, the cost of materials takes on high significance in our case. Labor efficiency is another tool that is employed continually by management to measure the quantity of labor taken by the output. Labor attainment, as shown on the monthly cost report along with material efficiency, is a comparison of actual direct labor dollars used to standard allowed. These material and labor efficiencies have become the barometers of the manufacturing operation. The rise or fall of a product's performance can be measured in terms of these percentages, as they are based on standards.

Our control of overhead is similarly based. The use of a fixed and variable formula based on actual output, determines allowable overhead costs. Control of overhead expenses is harder to attain, because they are not understood as well as costs which are directly chargeable and because accounting techniques have only reached a stage of development achieved much earlier for direct costs. Control must be exercised at the source by placing responsibility on individuals in the plant. In the case of overhead items it is indeed divided. The maintenance supervisor, production foreman and top management all have certain avenues of responsibility. However, standards help here, too. The basic approach to control overhead is the same as direct materials and labor. Standards should be set and performance measured against it, with corrective action taken when standards used fail repeatedly to reach the goal. Control of any product or expense item is exercised by keeping the costs within the limits determined for that particular level of operation.

Standard Costs and Inventory Valuation

Both raw material and finished goods inventories are valued in our company by extending the units in inventory by the standard cost. If inventories were to be valued, whether on a fifo or lifo basis, without use of standard cost, it would have to be done on the total quantity of the inventory because the inventory at Sylvania amounts to millions of lamps. If the inventory were, conceivably, valued on a unit cost basis of the total inventory, no identification could be made to specific types of lamps. Over one thousand different types of lamps are contained in the incandescent inventory. Under the present system, each type of lamp has an individual standard cost and the quantity by type is extended by the standard cost to compute valuation. As the standard cost varies greatly on different types, the standard value provides the only practicable detail in listing the breakdown of cost for inventory. Every month the ending finished goods inventory is listed by type, quantity and standard cost, for management to see the actual mixture of types and cost

and to take corrective action if the situation demands it.

Standard Costs and Budgetary Planning

The standard unit costs provide the basic data for converting the production schedules into total manufacturing costs for the financial budget. Standards also furnish information for the monthly three-month forecast. If standards were not employed, extensive investigation would be required to secure the necessary information, because of the inclusion of nonrecurring costs in the actual costs which would have to be used.

The relationship between standards and budget is especially close knit at Sylvania. The budget attempts to set up a predetermined standard of operations as a whole, as contrasted with the setting of predetermined costs per unit by product. Nevertheless, the viewpoint is the same. The cost accountant should be concerned with future operations for predetermined costs give management insight into what it can expect in estimated production costs for the coming period. If the budget is a plan of what will take place for the company as a whole and predetermined standards are what the production costs should be, then, of necessity, standard costs must be closely related to budgetary control.

Standard Costs and Pricing Assistance

Many times in the course of a month, the sales department, because of an inquiry of a potential customer or for the purpose of rounding out a particular line of products, requests from the cost department a figure for manufacturing cost, for help in setting a sales price for a new item. Time and effort are saved in answering such requests, if standard cost is in operation. Usually, some of the material prices and efficiencies, plus labor operations and attainment are known from the standards of existing lamps. The only special requirement, then, is to determine a limited number of unknown material and labor costs for the proposed lamp and apply the overhead burden rate. As the elements of speed and accuracy are essential for sales quotations to customers, standard cost has a decided advantage.

Does Management Know How Standard Costs Will Help?

The benefits which can be derived from standard costs have been outlined in this article, along with the general features of a workable program employed in the Lighting Division of Sylvania Electric Products, Inc. However, different conditions require different solutions. Any cost system will have to be adapted to provide the information which the company's management requests. That is the crux of the matter and places a responsibility upon the cost accountant. When standards are not available to compare to current operations, it is often the re-

sult of a lack of personnel to establish standards or the failure of management to appreciate what standards can do. They are a tool for management to aid in producing economically. It becomes a function of the cost accountant to explain the working, and results gained from the employment, of standard cost. If it is felt that standards would assist the operation, a selling job should be prepared in order that management may understand the usefulness of a standard cost system and install it.

Satisfaction comes from knowing that management has been provided with information and suggestions in order to improve plant operations and costs. The use of standard costs allows management to examine plant operations to a greater degree, with an eye to the reduction of controllable costs. The effects of management decisions that result from the employment of standards, aid in improving the profit position as well as the future competitive standing of a company.

Estimating the Month's Gross Profit Under Standard Costs

By PAUL W. OSLER

Supervisor—Cost Accounting, Controller's Staff, P. R. Mallory & Co., Inc., Indianapolis, Indiana

A practical solution of the problem of late reporting of operating results is the subject of this paper which recommends the issuance of an advance estimate in similar detail to the final report. Standard costs supplemented with various analysis and other techniques form the basis of an estimated operating report immediately available to management at the end of the period.

IT SEEMS SAFE to say that, in a highly competitive manufacturing business, one of the most important financial reports—if not the most—is the operating statement. It is from this that management derives the information necessary to assist in the formulation of financial policies. Fluctuating sales volumes, a high break even point, as well as changing material costs, may reflect business trends which require immediate action. However, in the past, it has been felt in our company that, by the time the published financial reports were received, it was too late for management to use them for other than statistical purposes. A method had to be devised by which

management would receive gross profit statements earlier. An estimated gross profit report was found to be the answer.

In developing our program for a rapid report certain basic premises were recognized. The estimated report would need to be presented in the same detail as the finished final financial statements. It would need to be accurate, first, because it would be a source from which management would be making decisions and, secondly, if it did not compare (or nearly) with the final statement, confidence would be destroyed not only in the accuracy of the report but in the ability of the accounting people to supply the needed information at the proper time. Further, the information would need to be immediately available to management at the close of any period and reflect all the facts up to the close of the period.

Some of our problems seemed insurmountable. An endless amount of detail would be required to compile information for an estimated gross profit report to be furnished between issuances of the regular monthly statements. In fact, certain costs are hidden in our manufacturing processes and come to light only on the completion of the periodic gross profit statements, such as unabsorbed overhead, excess labor and variance in material usage. Therefore, in order to have the necessary detailed information available, a certain amount of planning and routing of source information would have to be done with the least amount of disturbance to the normal accounting structure. An even higher degree of organization would be required in a centralized corporate accounting system, like ours, to compile and distribute information to outlying units for their use in preparing an estimate of gross profit. Nevertheless, all this effort would be compensated for by providing the information in time for it to be used to the best advantage.

Estimating Standard Cost of Current Periods' Sales

Our first step in preparing an estimate gross profit statement was to apply to the sales dollar for the period being estimated, a standard cost per cent to arrive at the standard cost applicable thereto. This percentage can be obtained from past statistics and will be fairly stable. It will vary, however, from month to month due to the sales mix, especially where several types of products are involved, each having its own process of fabrication. Some periods may have more sales of items having a high standard cost percentage to selling price, tending to raise the overall average. Others may have the reverse effect on the average. A finer solution would be to classify sales into types of product in the total sales dollar and apply a more accurate standard percentage against each class.

We decided to do this, which at once raised the question of how. The

method of segregating sales by types of products, each with its own relatively comparable standard cost relationship to sales, will depend on the volume of invoices being considered. We find it practical to use tabulating equipment. Sales dollars of each classification are listed in preparation for the application of the standard cost percentages. We get results like those shown below, although the working detail shown does not appear on the estimated gross profit report submitted to management. This shows only sales and standard cost of sales:

Product line	Sales	Std. Cost Per C.	Total Std. Cost	Mark-up
Class A	$ 400,000	$60.00	$240,000	$160,000
Class B	200,000	65.00	130,000	70,000
Class C	600,000	70.00	420,000	180,000
Total	$1,200,000		$790,000	$410,000

Having thus obtained satisfactory determination of the estimated margin between sales price and the cost elements included in standard cost, it was in order next to estimate the incurrence of other costs, such as engineering, tooling, royalties, variances from standards.

Basis of Estimated Product Engineering Charges

Due to its generality of purpose, product engineering is a type of cost comparatively difficult to estimate exactly. Unless a specific program of development is being maintained at a certain pace and an amount established to absorb the charges, it is difficult to discover a cost pattern applicable in estimating the impact of current charges. Product engineering costs, due to the aforementioned reasons, are estimated to have been incurred in amounts based on statistical information of past experience combined with planned current information relied on to disclose marked deviations from the past. This procedure results in an advance estimate as close to the actual outcome as it is possible to get.

To compile current information, engineering project numbers are assigned. Any material purchased specifically for the project or withdrawn from a central stock room on material requisitions is charged to one of these project numbers. The estimator, who usually is the divisional comptroller or his assistant, has access to these charges as they occur, inasmuch as the requisitions must pass through his department. Thus accumulated, the information for the total material charges to the engineering costs is readily obtainable at the end of the period. Another item of charges to these orders is labor. This cost comes from an analysis of the salaries and wages of engineers assigned specifically to the project. These labor charges are accumulated on job tickets and analyzed by the engineering department, which furnishes the estimator with the resulting figures. Undistributed engineering department costs such as fixed charges for depreciation, taxes, insurance, etc.,

together with general operating supplies, drafting salaries and wages, etc., are prorated to the engineering projects on the basis of the direct engineering salaries and wages.

Good judgment must be used by the estimator in analyzing the results to arrive at an advance figure for engineering costs. He must compare them with previous costs in relation to sales activity. This is especially true in the classification of engineering overhead.

Tool Costs Present a Similar Problem

Tool costs are considered in our accounting, as appropriately written off to cost of sales when incurred rather than to a deferred account for future amortization. This fact is mentioned because it suggests that tool costs charged against sales will vary with tool-making activity. It can be said, therefore, that tool costs fall into the pattern of engineering costs. If specific programs are being maintained, tool expenditures can be predicted quite accurately from the current information made available by the planning unit. However, unless this is known, it is difficult to determine the amount of charges in this classification because they are derived from several sources, i.e., factory labor, an applicable per cent of overhead applied thereto, and material from specific purchases of individual parts of a tool or die or from fabrication within the company's tool department, which would fall under the labor classification.

The accumulation of current information to permit estimate of tool costs for the current period is facilitated by the issuance of prenumbered factory orders for the complete purchase or tool room fabrication of a specific tool or die. Outside purchases or tool room labor and expenses are charged to these orders. When an order is completed, it is closed directly to tool cost of sales. The estimator has at his disposal a copy of each of the factory orders. As in the case of the compilation of engineering costs, the estimator can accumulate on his copy of the factory orders any material requisitions transferred to the order or any materials purchased for the order as taken from his duplicate copy of invoices furnished by the accounts payable department.

Labor and overhead costs of the company's tool department are obtained by applying a liquidating rate to a daily labor distribution of hours by factory orders. This rate is set by the tool department at the time its budget is prepared and its use is intended to absorb the expenses of the tool department. The total tool cost of sales for the advance statement is arrived at by adding to the material costs accumulated on the factory order the labor and overhead which is obtained by applying the liquidation rate to the daily distributed hours by factory orders.

Making Sound Estimates of Variances from Standards

For analysis purposes, variances from standards are divided into the three categories of labor, overhead and material. Of these, the labor variance can be predicted with a fair amount of accuracy at almost any stage of production. Actual labor cost at any stage of production is obtainable from time tickets which show the labor hours spent at each job operation. The standard labor at the same stage of production can be evaluated easily from the time tickets used in obtaining the actual labor cost. A standard rate of production is established for each operation and grade of labor and is shown on the time ticket. The standard labor earned or "labor load" maintained is arrived at by multiplying the standard rate by the production accomplished and entering it in the space provided. Labor time tickets show hours worked, hours earned at standard, and the number of pieces of a part number produced. These are calculated daily to determine payroll distribution, as well as labor efficiency of operation. Each day's analysis is accumulated until a period's activity is obtained to determine a standard labor load produced, and the resulting variance in labor costs is charged directly to cost of sales. This standard labor load can be substantiated by evaluating the labor value in shipments, in department transfers, and transfers to finished parts.

The overhead variance estimate presents a one-sided problem. It is relatively easy to find the standard overhead absorbed, for it results from a mathematical procedure of applying a specific predetermined overhead rate to the standard labor load produced. It is more difficult to estimate the actual expenses from which the standard absorbed will be deducted. To arrive at the amount of actual expenses as methodically and as accurately as possible, fixed overhead costs, such as heat, power, depreciation, taxes, insurance and the fixed salary classifications of supervision, clerical, floor and line service, etc., are summarized first. Expense items purchased outside are accumulated from duplicate invoices furnished by the accounts payable department. Requisitions for supplies withdrawn from a central stock room are analyzed. Expenses which are accumulated on a deferred plan, such as on factory orders or job orders, present a problem to the estimator since, not only is an analysis required of the expense charges to these orders but also of the ultimate closing of the order to the proper expenses or capitail account. A careful analysis of the incurred charges from labor, material transfers, or outside purchases is necessary to obtain a fairly close forecast of the outcome of the orders at the time they are to be closed.

Material variance calculation for the gross profit estimate is the result of an analysis of material requisitions issued from the central stock room

and charged directly to variance. These may be for parts lost or scrapped over and above the original amount issued by the production control department at the time the order was placed on the production floor for processing.

Completing and Commenting on the Gross Profit Estimate

The data obtained through the various analyses—and other procedures—outlined above is presented in the following form.

Sales		$1,200,000
Standard cost		790,000
Mark-up		410,000
Other costs:		
Engineering	$18,000	
Tools	15,000	
Royalties	3,600	
Variances:		
Labor $ 8,500		
Overhead 11,000		
Material.. 16,500	36,000	
Total other costs		72,600
Gross profit		$ 337,400
Per cent to sales		28.1%

Percentages of each item of cost to sales may also be shown, in order to make comparisons more significant.

As the detail information is accumulated, any abnormal charges or credits should be noted, in order to explain to management the reasons for a good or poor result as indicated by the estimate of production performance during the period. Underlying detail can be extended almost indefinitely, but good judgment should be used as to the significance of added information. After all, the purpose of the estimate is to furnish management with a quick and early glance at the results of operations. Most reports and financial statements summarizing the activities of a department are too involved for the department head to grasp the meaning of the information contained.

Examples of comments which could be included with the report, are:

1. Engineering costs are abnormally high by approximately $3,000, due to the utilization of two extra engineers in order to meet the schedule of development needed. This was approved by the production superintendent.
2. Labor excess is slightly higher due to:
   a. Faulty raw material..... $ 300
   b. Die trouble ..... $ 500
   c. New operators $1,000
3. Material excess is slightly under normal due to the return of $2,000 material value to active inventory, which previously had been written off.

Regardless of how thorough the analysis is of each type of manufacturing cost, a certain amount of judgment must be used in interpreting the figures. Sales amounts may vary in the different periods due to shipping schedules or billing facilities. This may mean that production is holding steady and accumulating costs which will be absorbed in a future period or month. Thus, one period reporting a small billing figure may carry with it an amount of cost of operation far exceeding the sales. Although this consideration does not apply to the

standard costs estimates (as they are applied directly to the sales billed) it does apply to other costs such as salaries, indirect productive wages and normal fixed charges, which do not have a direct bearing on the amount of sales billed in a certain period being estimated.

The estimating of operating results at the gross profit level may not be practical for all businesses but it certainly has made quite a contribution to our management's financial decisions regarding inventories, production planning, and has indicated where to take prompt corrective action.

Letters to the Editor

HOW WE COMPENSATE OUR SALESMEN

Editor, N.A.C.A. Bulletin:

I SHOULD LIKE to describe a plan of salesmen's compensation and reimbursement which is being used with a considerable degree of success. In doing so, I shall have to assume a hypothetical situation which I think will not be unlike many of those encountered in a typical distributor's operation. The territory to be covered is state-wide and is divided into smaller territories on a geographical and economic basis, as nearly as it is possible to do so, assuring each salesman of a potential which is worthwhile and which will, at the same time, provide a challenge to his ability. In making such a subdivision, it is only natural that some of the territories will have wider spread than others. Some will be concentrated in urban areas, while others will be mostly of rural. The type of area and the cost of covering it must be a factor to consider in arriving at our method of compensation, keeping in mind the fact that we want to arrive at a basis which will be as nearly a true direct cost as possible, varying directly with sales.

The amount of the base salary may be determined in a normal manner by the qualifications, of the individual salesman the demands of the territory to which he will be assigned, and the stage of development of the territory. From this starting point, the base salary will depend upon his application to his work, willingness to cooperate with management policies, and initiative.

But what about incentive pay or, as it is called in the field of distribution, commission? Many plans call for markedly high commission rate (perhaps with a low base salary) in order to make the job attractive. The fallacy of this plan is that, as volume increases, the income resulting reduces the incentive. In some instances, this is taken care of by a gradually reducing scale of commission, but this too, affects sales drive adversely. After considering as many methods of commission payment as we could find in use, we decided upon a low rate which, added to satisfactory base salary, provides adequate compensation but, at the same time, in combination represents reduced unit cost as the volume increases. This enables us to control the direct sales cost within very narrow limits and has provided a method of compensation which is very acceptable to all salesmen.

Beyond this point lies the question of paying the travel expenses of the salesmen. We are interested only in seeing that the out of pocket expenses are returned to the salesman. A flat mileage rate is not a true measure of actual auto operating expense. It overpays the man with the long mileage territory and does not reimburse the man with the concentrated urban area. The fair way to take care of this item, it seems to us, is to properly recognize the fixed operating charges such as depreciation, licenses, insurance, etc., and settle at a per diem allowance to adequately cover these items. Then a mileage allowance is prepared based upon actual gas, oil, and maintenance charges experienced by operators of the low-priced line, additional costs of operating larger cars to be borne by the salesman. Other expenses are reimbursed on out-of-pocket basis.

J. L. ZOLL

THE IMPORTANCE OF "GATE CONTROL"

Editor, N.A.C.A. Bulletin:

IF WE ARE TO maintain a reasonable control of our materials, we must not only set up controls over them but also must restrict the movement of people who may have access to them. Although the areas mentioned in the following paragraphs are typical of those needing control they are by no means complete. They do, however, suggest a minimum goal for "gate control."

Employees should be required to have identification badges. This requirement is not so much a check on the employees, themselves, as a protection against the entrance of unauthorized persons. Employees should also be restricted to certain hours when they may enter the plant. If an employee is required to work at some hour or day other than his regular shift, a special pass should be given him by his foreman. If an employee desires to take packages or personal effects out of the plant, he should be required to obtain a package pass from his foreman or supervisor, on which is stated the contents of the package or bundle.

All visitors should register with the plant protection officer or at the reception desk. Badges which should be worn in plain sight should be given to the visitors, but, no matter how well identified, they should not be allowed to wander aimlessly through the plant. Escorts should accompany visitors to and from destinations.

It is particularly important to exert strict control over outside contractors and their employees while in the plant. These men vary from construction workers, telephone repairmen, equipment repairmen, vending machine operators and others. They often are required to work in many areas of the plant for long periods of time. In addition, quite often they come in trucks or cars. Unless some control is maintained over their movements, they are not unlikely to carry away plant material whether by inadvertence (material issued to them for use) or otherwise. Independent contractors and their employees should register on entering the plant and on leaving when their work is done. Badges should be issued, and a record of name, affiliation, and work area should be maintained.

Vehicles of all types, sizes, and variety enter and leave the plant continuously all day. These vehicles must be carefully controlled, inasmuch as large quantity of materials come and go in these vehicles. Empty trucks leaving the plant should be carefully inspected for material not covered by proper documents. A record of every commercial vehicle entering or leaving the plant should be maintained by the plant protection department on a daily truck record. All trucks should surrender one of the following documents before being permitted to leave: miscellaneous shipping order, inter-plant transfer, bill of lading, railway express receipt, parcel post register, or general truck pass. Moreover, the plant protection officer should inspect the contents of the truck to determine whether they are, in general, covered by the exit document.

The examples which have been given illustrate some of the controls which may be set up to make sure that only authorized materials enter and leave the plant. The type or extent of control necessary depends on the nature of the business, the value of material coming in and going out, and its volume.

FRANK L. ESPOSITO

Notes on Current Reading

Books

Measuring Business Changes — A Handbook of Significant Business Indicators.

Richard M. Snyder, John Wiley & Sons, Inc., New York, N. Y., 1955, 382 pp., $7.95.

The question, "Who does not want to?", suggests the attractiveness of the topic of this book which approaches its subject by recognizing that "the businessman today needs two sets of facts to make intelligent decisions. One covers his own operations. The other tells him what is happening in his industry and in the economy as a whole." Emphasis throughout is upon sources of data, which are identified and described. The main divisions of the book are "National Income and Product," "Population," "Labor: Employment and Earnings," "Commodity Prices," "Production and Business Activity," "Construction Activity and Costs," "Trade," "Financial Activity," and "Stock Prices."

Accounting Trends and Techniques — 9th Edition.

American Institute of Accountants, 270 Madison Avenue, New York 16, N. Y., 266 pp., $15.00.

Not quite a decade of annual commentaries upon "published corporate annual reports" is marked by the present work which "incorporates the results of a study of the accounting aspects of financial reports . . . of 600 companies . . . (which were) accompanied by opinions from 73 firms of certified public accountants and covered fiscal years ending between May 1, 1954 and April 30, 1955." Detailed reflection of practice appear under five main sections relating, respectively, to financial statements (as a whole), the balance sheet, the income statement, retained earnings and capital surplus, and the accountant's report.

Proceedings of the Second Annual Institute of Accounting.

University of Colorado, Boulder, Colorado, 1955, (Photographic process), 104 pp.

Reported in this publication are the four principal addresses given and the introductory papers to two group discussions conducted at the Institute on Accounting held last May under the auspices of the Division of Accounting of the School of Business of the University of Colorado. Address topics were interpretation of operating reports, client preparations for external audit, C.P.A. standards and conflicts between concepts of income for accounting and tax purposes. The discussions dealt with property accounting and presenting accounting information to management.

Accounting Papers of the Ninth Annual Conference of Accountants 1955.

University of Tulsa, Tulsa, Oklahoma, 99 pp., 1955.

The initial address reproduced in the present report of proceedings reflects the location of the April 1955 Conference in which they originated, dealing, as it does, with "Determination of Gas Production Cost." It was followed by a panel discussion on "Accounting Procedure for Unit and Joint Lease Operations." The remaining three papers have a methods emphasis and concern work simplification (two) and integrated data processing.

Report Writing for Accountants.

Jennie M. Palen, Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y., 1955, 603 pp., $9.25.

In large part, this discussion of report writing has the needs of public accountants' staffs primarily in mind. In its

SELECTED ARTICLES FROM ACCOUNTING PERIODICALS

THE CONTROLLER, *December* 1955 (2 Park Avenue, New York 16, N. Y., single copy $.50)

How Some Companies Are Planning and Controlling Their Operations. John V. van Pelt III.

Floor Costs and Government Contracts. Paul M. Trueger.

Break-Even Analysis for Cast Forecasting. Jim G. Ashburne.

THE FEDERAL ACCOUNTANT, *September* 1955 (P. O. Box 53, Washington 4, D. C.)

*The Army Industrial Fund — An Introduction. H. A. Kriebel.

ILLINOIS CERTIFIED PUBLIC ACCOUNTANT, *Winter* 1955-56 (208 South La Salle St., Chicago 4, Illinois, single copy $.40)

A New Approach to Budgeting. Richard F. Peirce.

JOURNAL OF ACCOUNTANCY, *January* 1956 (270 Madison Avenue, New York 16, N. Y., single copy $.75)

The Funds Statement And Its Use by Analysts. Charles T. Horngren.

*Employer's Duty to Give Economic Data to Unions. Max J. Miller.

RETAIL CONTROL, *December* 1955 (100 West 31st Street, New York 1, N. Y., single copy $.75)

Variable Budget Control. Fred V. Gardner.

Expense Budgeting — The Key to Operating Within Your Income. Kenneth P. Mages.

*Further mentioned in accompanying notes on particular articles.

with this, the first chapter is entitled, "Responsibilities of the Independent Auditor" and the second, "Uses and Structure of the Audit Report," followed by chapters related to balance sheet and income statement items, opinions, and comments. It is here that more general matter also appears, in three chapters on rhetoric and one on "The Right Word."

Standard Handbook for Accountants.

McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y., 1956, 1165 pp., $15.00.

This handbook was in preparation by J. K. Lasser at the time of his death. Multi-authored (there are more than fifty contributors), it is focused on the improved practice of public accounting, including management of C.P.A. offices practices and audits. However, Section 4, which includes eleven contributors on such topics as "Designs for Effective Records" (among Mr. Lasser's contributions), "Effective Budgetary Practices," "Systems for Expanding Business" and "Electronic Data Processing," have broader impact.

Articles

Profit Planning Under Automation.

John H. Rittenhouse, The Controller, January 1956.

The springboard of this article is the viewpoint that automation of industrial processes will depend on its profitability and that this consideration will govern the speed of progress in this direction and also suggests the approach necessary, requiring business forecasting and the appraisal of cost patterns resulting from various degrees

SELECTED ARTICLES FROM BUSINESS PERIODICALS

BUSINESS BUDGETING, *November* 1955 (National Society for Business Budgeting, The Andrew Jergens Company, 2535 Spring Grove Ave., Cincinnati 14, Ohio)

Forecasting for Planned Profit and Control. C. E. Manteuffel.
Profits Are Worth Planning For. Charles P. Reynolds.
The Budgeted Hour. E. A. Vatter.
Fixed Assets—Control of Expenditure and Technique of Accounting. Frank Judd.

OFFICE EXECUTIVE, *January* 1956 (132 West Chelton Avenue, Philadelphia 44, Pa., single copy $.50)

Systems Mechanization—Office Paperwork. P. B. Garrott and Robert A. Scudder.
Automation—Electronics in Your Office. Sidney Lyons.

of increased mechanization, with especial attention to break-even points.

The Army Industrial Fund—An Introduction.

H. A. Kriebel, Federal Accountant, September 1955.

A source of interest to accountants in industry—because it attempts to put governmental activities on an enterprise basis, financially and cost-wise—the Army's concept (and application) of industrial fund accounting is here introduced as related to Watertown (Mass.) Arsenal. The paper is the first of a group of seven papers on the application published in the Arsenal's own periodical.

What Is Operations Research?

Annesta R. Gardner, Dun's Review and Modern Industry, December 1955.

Flanked by boxes containing, on one side, definitions of operations research and, on the other, possible uses (classified by present prospects of success), the center four columns (large-size pages) of this two-page spread concentrates on further sources of information on the subject. It should be mentioned that there is a continuation page for the definitions, which are nineteen in all, and that the uses mentioned are thirty-two in number.

Employer's Duty to Give Economic Data to Unions.

Max J. Miller, Journal of Accountancy, January 1956.

Not directly an accounting paper, this article reviews the current status of law and decisions as to information which unions may claim from their companies. It is suggested in closing that the obligation to furnish information extends to "supply (ing) detailed information concerning all components and factors that enter into the determinination of wages—direct and indirect—and other forms of compensation." A considerable list of case references is given.

For Your Information

IN THE ARMY NOW

IN THE FEBRUARY 1956 issue of the *N.A.C.A. Bulletin*, there appeared Commander Eugene W. Hurn's article, "Navy's Performance Budget—A Step in Military Cost Control." This month we turn to another Service. Reproduced here are two sections, as entitled below, of the first chapter of *The Comptroller's Guide* issued during 1955 by the Department of the Army. The selections reflect the theme of the chapter, which is captioned "The Army's Managerial System" and suggest the nature of the contents of the publication as a whole, which includes seven chapters and runs to 77 pages. The two excerpted sections, in which N.A.C.A. members will discern many considerations long emphasized in industrial accounting, follow:

Army Program System

"Programming in the Army provides for grouping all Army activities into major functional categories. Each functional category constitutes a Department of the Army 'primary program.' Programming, i.e., the preparation and use of these primary programs, involves program development, program execution, and program review and analysis. These three elements of programming are carried on continually at every echelon of command in the Army regardless of what they may be called or whether they are identified and given a name. They are interrelated and mutually supporting. Development depends upon data compiled for reviewing and analyzing execution. Execution depends upon guidance from planning. Review and analysis measures actual against planned and furnishes data for the planners and the executors of programs.

a. Responsibility for Programming.

(1) Programming is synonymous with command or general management. The person ultimately responsible is the commander. He can delegate duties to subordinates, but final responsibility, whether he carries out the duties himself or through subordinates, is his.

(2) At the Department of the Army, working responsibility has been divided among three subordinates of the Secretary of the Army and the Chief of Staff. A Deputy Chief of Staff for Plans and Research is charged with program development. A Deputy Chief of Staff for Operations and Administration is responsible for program execution; and the Comptroller, for program review and analysis.

(3) At lower echelons, this same organizational concept is followed in some headquarters. In others, the working responsibilities are distributed among the Chief of Staff or Deputy Chief of the Service and one or more deputies or other subordinates.

b. Responsibility for Primary Programs.

(1) Under programming one individual is named 'program director' for each separate program of the command. That individual is responsible for directing program development, execution, and the review and analysis of the assigned program. The commander, hence looks to one individual for each major function.

(2) At the Department of the Army, for example, responsibility for the Army's primary programs is divided among the Deputy Chief of Staff for Plans and Research, the Deputy Chief of Staff for Operations and Administration, Deputy Chief of Staff for Logistics, the Comptroller of the Army, the three

Assistant Chiefs of Staff, the National Guard Bureau, and the Chief, Army Reserve and ROTC Affairs.

(3) At most subordinate headquarters where programming is in operation, responsibilities are similarly assigned. At one Army area headquarters, for example, responsibility for its command program is divided among the four assistant Chiefs of Staffs, the Comptroller, and several special staff officers.

c. Relationship of Comptroller to Programming.

(1) At every echelon at which programming is done, the comptroller is closely related to programming or, if it is not identified as such, to the general management process. As a part of the general management staff, the comptroller bears a share of the commander's total responsibility for effective management. In discharging this responsibility he may be expected to assist in designing the command's program system; i.e., to develop and persistently to improve the procedures by which activities are planned, and by which their execution is made more effective and, subsequently, reviewed and appraised. Especially, he will be concerned with maintaining, for his commander, a balanced or integrated review of all the programs or activities of the command.

(2) At higher echelons, a comptroller will likely be heavily engaged in system and procedure design and in planning, as well as in the execution and review and analysis of programs. At an installation, on the other hand, a comptroller will likely devote less time to designing systems and to planning. The installation comptroller will be concerned with fitting major command or service-wide systems to the needs of the installation or vice versa. He will be concerned with planning and budgeting specific, short-range projects, allocating the command's resources, and reviewing the effectiveness of performance of each division or branch.

Financial Management

a. Financial management complements programming. Programming defines and schedules the mission to be accomplished. Through financial management the commander is provided with all funds necessary to acquire the resources — men, materials, and facilities — needed to perform assigned missions. Financial management, in addition, provides the bases for holding the commander accountable for the judicious use of these resources.

b. To this end the Army's financial management process integrates accounting, budgeting, and financial reporting techniques into a single system. Its effectiveness depends upon the prompt availability of accounting data in a form that will assist the commander in planning, executing, and evaluating for operations.

c. Financial management consists essentially of eight elements.

(1) Integrated accounting; i.e., a single comprehensive system of accounting and reporting that ties together and improves existing accounting systems and that will provide comparable financial data throughout the Army.

(2) Financial property accounting; i.e., a system of accounting for property in dollar values as well as quantities.

(3) Stock funds; i.e., the use of working capital (revolving) funds to finance inventories or supplies and other stores.

(4) Industrial funds; i.e., the use of revolving or working capital funds by industrial and commercial-type activities producing goods or performing services for other agencies and activities.

(5) Management funds; i.e., the accumulation and distribution of expenditures among two or more appropriations involved in a common or joining operation.

(6) Consumer funding; i.e., providing using agencies and installations with the funds to purchase goods and services needed in their operations.

(7) Cost of performance budgeting; i.e., the projecting and reporting on costs and funds (obligational authority) for Army missions, programs and activities; using the budgetary systems not only for obtaining and controlling the use of funds but also as an internal management mechanism to assist commanders in control of the use of resources and the cost of their operations.

(8) Internal audit; i.e., the use of audit techniques to assure adequate control and surveillance of accounting and financial operations.

d. The Comptroller of the Army is responsible for designing and developing the various elements of the financial management plan. The policies, standards, and requirements for each element are enumerated in appropriate Army directives or will be when the particular element of the plan is introduced. Installation comptrollers are responsible for assisting their commanders in implementing each element of the plan applicable to their installation. This responsibility involves:

(1) Interpreting to the staff of the command the objectives, advantages, and workings of each element.

(2) Making certain Army-wide requirements are met.

(3) Adapting prescribed procedures and methods to fit the needs of the installation commander and his staff so that new procedures and methods are properly integrated with existing administrative procedures and methods.

e. Each element serves a particular purpose in achieving more effective management of non-tactical activities. Together these elements form a system which—

(1) Operates on the fundamental premise of matching financial requirements directly with the command missions and operations. At each level of command, from the installation to the Department of the Army, the aim is to set forth the work to be done and its costs.

(2) Introduces dollar accounting for property and working capital funds as major tools of logistics management. This is done not only to improve methods of supply management, but also to permit costs of goods and services used in current operations to be determined and controlled on the basis of dollars.

(3) Provides, through introduction of new budget methods, a recurring procedure for matching operations and costs. This becomes the central element for improving control of operations.

f. The use of all the elements of the plan in budgeting and controlling operations is enhanced by the employment of the integrated accounting elements. Integrated accounting ties together in a single system the various accounting activities of financial management. From the integrated accounting system, comptrollers will be able to provide managers with financial data necessary for evaluating the results of their operations and for determining the status of their resources. In this way they will be aided in obtaining maximum effectiveness from the resources—men, material, and facilities—made available to them."